AD NUMBER

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NEW LIMITATION CHANGE

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AUTHORITY

SAMSO USAF ltr, 10 Apr 1972

[redacted]

CONVAIR ASTRONAUTICS UNCLASSIFIED

GENERAL DYNAMICS CORPORATION

TPL: 2248
26 May 1960

AD 832767

To: All Holders of Report AZC-27-059

From: T. M. Wooster - Test Planning

Subject: Instrumentation Configuration Report, E-R&D Summary, Revision B, dated 15 March 1960

The enclosed document constitutes a major revision to the E-R&D summary report. This revision incorporates all instrumentation changes made since the publication of Revision A and reflects the current instrumentation throughout the text, Illustrations and Tabulations.

Since Revision B supersedes the previous E-R&D Flight documentation, the original report plus Revision A should be removed from the 3 ring binder originally supplied and Revision B inserted.

The instrumentation configuration report for missile 3E has been included in this package and should be inserted in the back of the E-R&D summary.

Disposition of the replaced pages should be in accordance with existing security regulations.

Note that Revision B is now "Flight Missiles" only and that all E Series Captive instrumentation is documented in Report AZB-27-015. E Series Operational Instrumentation (IRSS) has also been removed from Revision B and is covered in Report AZC-27-068.

T. M. Wooster

T. M. Wooster
Instrumentation Planning

TMW:WSB:prg

Distribution List
Report AZC-27-059

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FORM A143

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CONVAIR ASTRONAUTICS

GENERAL DYNAMICS CORPORATION

TPL: 2347
17 August 1960

To: All Holders of Report AZC-27-059

From: T. M. Wooster - Test Planning

Subject: Instrumentation Configuration Report E (R&D) Summary, Revision C, dated 13 July 1960

The enclosed pages constitute a minor revision to the E-R&D Summary Report. This revision incorporates all instrumentation changes made since the publication of the original report and reflects the current configuration in the two composites.

It is recommended that the enclosed pages be physically incorporated into Report AZC-27-059, replacing the superseded sections in order that holders of the document may have a current and complete instrumentation configuration document for the E-R&D series under a single cover.

Disposition of the replaced pages should be in accordance with existing security regulations.

T.M. Wooster

T. M. Wooster
Instrumentation Planning

TMW:WSB;prg

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Report AZC-27-059

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REPORT NO. AZC-27-059

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Rev. D 15 May 61

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INSTRUMENTATION CONFIGURATION SUMMARY (FLIGHT MISSILES)

E SERIES

Classification Changed To: UNCLASSIFIED

Date 5-14-65

Authorized [illegible] DD [illegible] 1/3107A

Reclassific[illegible] Dept. Date

Richard J. Cook 1301 [illegible]-65

PREPARED BY Instrumentation Planning

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T. M. Wooster

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APPROVED BY P. J. Lynch
P. J. Lynch

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
A	1 Dec '59	WSB	REVISE:	
			Illustrations	Section 4
			E Series Composite By System	Section 5 & 6
			E Series Composite By Problem Area	Section 7 & 8

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[redacted]

FORM NO. A-701-2

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REPORT NO. AZC-27-059

PAGE NO. A

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
A	1 Dec '59	WSB	DELETE:	
			SE Master Tabulation	Section 7
			2E Master Tabulation	Section 8
			SE Objective Test Plan	Section 9
			2E Objective Test Plan	Section 10
			LB JW HKM	

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
B	15 Mar '60	MLM	REVISED:	
			Text Rewritten to Remove Captive and	
			Operational Programs	Sections 1-6
			Schematics	Section 7
			Instrumentation Composite	Section 8
			Objective/Instrumentation Composite	Section 9
			IBM CODE KEY	Section 11
			MLM HRM	
C	13 July 60	WSB	REVISED:	
			Instrumentation Composite	Section 8
			Objective/Instrumentation Composite	Section 9
			WSB HRM	

INSTRUMENTATION CONFIGURATION
SUMMARY
(FLIGHT MISSILES)
E SERIES

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
D	15 MAY 61	WSB	Company name change	All Revision D pages
			Update report and tabulations to include program changes	i, iii, vi Section 1-5, 7, 8, 9, 12
			UPDATE:	
			Instrumentation Measurement Composite	Section 8
			Objective/Instrumentation Composite	Section 9
			REVISED:	
			IBM CODE KEY	11-3, 11-4, 11-7 thru 11-14
			DISTRIBUTION LIST	13-1
			ADDITIONS:	
			Summary of Recent Significant Instrumentation Changes	1-5 and on
			Illustrations	7-31 thru 7-35
			Sequence Pen List	12-1

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
D	15 MAY 63	WSB	DELETIONS:	1-
			Two telemetry sets on stripped	
			missiles	1-
			WB TW HRM for RJL	

FOREWORD

This report describes the instrumentation provided for the Series E Atlas Flight Test Program. Instrumentation contained in this report comprise General Dynamics/Astronautics and associated contractor data requirements as evaluated 15 May 1961.

Information contained in this report will be used by Instrumentation, Design, Operations, and Data Reduction Groups to determine instrumentation, data handling, and data reduction requirements. Measurement modification will either originate in the Instrumentation Planning Group or will be submitted as a recommendation to this group.

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LIST OF ILLUSTRATIONS

SUMMARY

This report describes the instrumentation presently planned to support the Atlas Series E R&D Flight Test Program. This instrumentation has resulted from a detailed analysis of missile systems design, program test objectives, and test operations considerations.

Section 3 of this report describes the measurements to be made for evaluation/malfunction analyses of the Atlas vehicles. Included are reasons for making the measurements, descriptions of unusual instrumentation techniques utilized and a summary of what will be learned from the data obtained.

The methods to be utilized in acquiring test data are detailed in Section 4. The telemetry, landline, and tracking systems planned for the Series E program are described with reference to hardware utilized, principle of operation, capacity and accuracy. Included also is a summary of the methods of acquiring supporting data. (B)

Section 5 of this report presents a summary of the data handling, processing, and reporting plan for the program. Operating instrumentation required to conduct missile checkout, pre-count, and countdown operations is discussed in Section 6.

In order to clarify the measurements, instrumentation functional schematics have been included in Section 7 of this report. (See List of Illustrations.)

A complete summary of the Series E Flight Test Program internal instrumentation and Ground Support Equipment (GSE) instrumentation is shown in Section 8. The test objectives for these flight missiles along with their associated instrumentation may be found in Section 9.

Specific instrumentation configuration and associated parameters for the individual Series E R&D missiles will be described in supplements which are to be filed in the back of this summary report. (Note 3-E is already included.) Tabulations of the tracking and support da requirements are shown in Section 10. Official Convair requirements have been submitted to AMR through BMD in report AE60-0345. (B)

In order to clarify the format and abbreviations utilized in the IBM tabulations, an instrumentation tabulation code key is included as Section 11.

SUMMARY OF TELEMETERED MEASUREMENTS
TYPICAL SERIES E MISSILE (3-E)

MISSILE SYSTEM INSTRUMENTED	TYPE OF MEASUREMENT																
	ACCELERATION	ROTATION RATE	CURRENT	DEFLECTION	POWER	POSITION	INTENSITY	VELOCITY	VIBRATION	PRESSURE	FREQUENCY	RATE	TEMPERATURE	VOLTAGE	TIME	DISCRETE POSITION	TOTAL
AIRFRAME							2						7				9
RANGE SAFETY														2		1	3
ELECTRICAL											1			3			4
PNEUMATICS										8			4				12
MOD III BEACONS			1		1									2			4
HYDRAULICS										2							2
GUIDANCE (INERTIAL)	6			4		5		3	6	1			5	11	2	8	51
MISCELLANEOUS				1												7	8
PROPULSION	2	3		2						18			5			3	33
FLIGHT CONTROL				13								3				1	17
TELEMETERING													2				2
PROPELLANT UTILIZATION										2				1			3
PAYLOAD																1	1
AZUSA TRANS-PONDER					2												2
TOTAL	8	3	1	20	3	5	2	3	6	31	1	3	23	19	2	21	151

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SUMMARY OF LANDLINE MEASUREMENTS
TYPICAL SERIES E MISSILE (3-E)

MISSILE SYSTEM INSTRUMENTED	TYPE OF MEASUREMENT												
		ACCELERATION	CURRENT	DEFLECTION	POSITION	VELOCITY	PRESSURE	STRAIN	TEMPERATURE	VOLTAGE	TIME	DISCRETE POSITION	TOTAL
PNEUMATICS							4						4
GUIDANCE (INERTIAL)		6	3	3	5	3				1	1	6	28
LAUNCHER				2				2	4				8
MISCELLANEOUS												1	1
FACILITIES & SITE							3		2			5	10
PROPULSION				1			8		7			10	26
FLIGHT CONTROL SYSTEM										17		1	18
PROPELLANT UTILIZATION										1		8	9
TOTAL		6	3	6	5	3	15	2	13	19	1	31	104

SUMMARY OF RECENT SIGNIFICANT INSTRUMENTATION CHANGES

The following text and schematics have been added as a supplement to the original report.

The revised tab runs should be inserted in their proper place in the body of the report. These tab runs incorporate the instrumentation that has been added or revised as a result of the added tasks and modifications to the systems presently installed in the latter Series E missiles.

I. AERODYNAMIC HEATING

A. Instrumentation has been located on the antenna support struts to obtain data for the study of Aerodynamic heating effects on the struts and the laminated insulation protecting them. New design has eliminated the Azusa antenna strut. Due to similarity of design, measurements A978T and A979T are located on General Electric Antenna struts. The Azusa measurements A680T and A681T have been deleted.

B. To insure that the temperature in the main and the clamshell fairings are not too severe, the components have been wrapped with insulation. Additional data to determine if continued wrapping is necessary will be provided by measurements A2T, A19T, A20T and A21T. (D)

C. Calculations indicate that temperatures caused on the missile structure by the piggyback pod may cause the structure to be marginal. Temperature measurements (A41T, A42T, A43T, A44T, A45T) are needed at the predicted hot spots to evaluate the problem and determine the effectiveness of the thermal coating (Dynatherm). In conjunction with this study, aerodynamics temperature measurements (A52T, A53T, A54T, A55T) are placed near the AFSWC pod, and (A46T, (A47T, A48T, A49T) near the ADF fairing.

D. To obtain data on the performance of the missileborne portion of the ground pod cooling system the following landline instrumentation has been added: 11 temperature measurements on the ROTARY INVERTER in the B2 POD, QUADRANT 2; 16 temperature measurements on the GE PULSE BEACON in the B1 POD, QUADRANT 4; 8 temperature measurements on the NO. 2 TELEMETRY PACKAGE, B1 POD QUADRANT 4; 10 pressure measurements on PITOT TUBES in the ducts from the mobile air conditioning unit to the missile, 5 temperature measurements on PORTABLE THERMOMETERS, and 2 pressure measurements on PORTABLE MANOMETERS.

E. In order to measure the ambient temperature of the ARMA pod, landline measurement N1932T has been added on all missiles flown from complexes 11 and 13.

II. AFSWC POD LANYARD

The camera, N1517N, AFSWC POD LANYARD will be set up to view the lanyard which pulls out of the AFSWC pod at liftoff. This coverage is desired to check any tendency of the pod timer lanyard to snag or hang up on any missile pertuberance.

III. ENGINE ENVIRONMENT

Data from three (3) temperature measurements (A933T, A934T, A935T) taken on the AEDC AFT SHIELD CALORIMETER will reveal total heating rates, relative heating intensity of a hot spot between engines, the relative heating intensities of the outer and inner heat shield peripheries, and model scaling laws applicable to recirculation predictions.

IV. STRIPPED MISSILE STUDY

Three R&D Series E&F missiles have been stripped to approximate operational missile weight. Primary mission of these three vehicles is to demonstrate maximum range flight with a Mark 4, Mod 1 re-entry vehicle.

In order to meet this stripped weight configuration telemetry packages No. 2 and No. 3 have been deleted. In order to provide sufficient channel space on the remaining telemetry package the guidance instrumentation was reduced to correspond to that flown on operational vehicles. The Arma R&D Analog Signal Converter (ASC) will be used and all unused data signal leads will be tied back at the telemeter input.

V. PROPULSION

A. Due to the free launch configuration, the E series missile lifts off the pad when the engine thrust reaches approximately 60% of nominal and the engine start sequence is still incomplete. In order to obtain continuous, high frequency response data during the entire engine start sequence for failure and performance analysis purpose, a trailing wire instrumentation umbilical will be provided. The trailing umbilical will be attached to the missile for at least ten feet of

vertical travel and supply data for a minimum of three seconds after engine start. The data will be recorded on a FM magnetic tape to allow the highest frequency response and most comprehensive data reduction methods to be utilized. The selected measurements that will be transmitted via the trailing umbilical are:

Accelerometers on booster (P1208O, P1209O) and sustainer (P1206O) engine LOX domes detect excessive engine vibration caused by combustion instability, propellant surges, and other transient phenomena. Pressure instrumentation in the booster engine LOX (P1001P, P1003P) and fuel (P1002P, P1004P) turbopump inlets determine satisfaction of engine interface requirements, propellant ducting integrity and turbopump performance. Booster high pressure propellant ducting integrity, main propellant valve operation, turbopump action, and engine transient behavior are detected by pressure measurements in the booster LOX (P1091P, P1092P) and fuel (P1093P, P1094P) injection manifold.

A. The booster engine LOX pump inlet temperature (P1054T) will be monitored by regular landline system instrumentation during launch countdown. This information will assure that turbopump starting NPSH requirements are satisfied and determine the adequacy of the LOX topping and slug systems.

B. Four (4) sequence measurements (P1225X, ENGINE CONTROL READY, P1229X, LOX HIGH TOPPING, P1230X, LOX LOW TOPPING, and P1231X, LOX 100% SLUG COM) used for flight test and systems validation will provide time-sequence of operation during ground checkout.

VI. PROPELLANT UTILIZATION

A. The Acoustica propellant utilization system using a CA 108 (5 card) computer assembly will be operated closed loop (sustainer main fuel valve controlled by the computer assembly). Six basic measurements are used to indicate system operation. These measurements and the functions of each are described below:

U132X, Acoustica sensor station counter output determines the adequacy of operation of the blockhouse generated reset signal and also determines to which sensor pair (corresponding stations in each propellant tank) the computer is connected.

U112V, Error counter output. This measurement is required to determine whether the PU computer responded properly to the error time measured by the computer monostables and that the error sense relay in the computer functioned according to error sense (LO_2 or fuel rich). This measurement also provides a check on operation of the digital to analog converter.

U113V, servo feedback voltage, is used to determine whether the PU system moved the PU valve to the correct valve angle.

U135X, Acoustica sensor signal, represents the output of two monostable multivibrators which are triggered by the uncovering of the acoustical sensors. The signal can exist at any one of four states dependent upon activation of either or both monostable multivibrators or deactivation of either. This measurement will furnish information on discrete tank levels versus time, opening and closing time of oscillator to counter gate, and desired magnitude and sense of the error command signal.

U133X, Acoustica Schmitt trigger output. This measurement furnishes time correlation between the oscillator and monostable multivibrator outputs and monitors the system ability to prevent transients of less than 100 milliseconds from triggering the computer.

U134X, Acoustica time-shared oscillator output. This measurement, in conjunction with U135X, determines if any spurious sensor uncoverings occurred.

B. Information will be provided by measurement U107C PU SV AMP OUT, which will separate the electronic and hydraulic system with respect to failure analysis of the propellant utilization system.

In order to enable the launch crew to be assured of the PU valve operation prior to propulsion start, a redline measurement (U1107C) has been added for those missiles which utilize the Astronautics PU system. This measurement indicates whether or not current is flowing in the PU servo-control loop and allows sufficient time to abort if PU current is not present.

VII. HYDRAULIC SYSTEM

A. Instrumentation added will provide data for evaluation of the performance of the airborne hydraulic system. Measurements H130P, S HYD PUMP DISCH, and H185P, S HYD PUMP INLET will determine the proper operation of the sustainer hydraulic pump. H191P, HI PR TO MANIFOLD, and H212P, VERNIER RETURN in conjunction with H185P will give a profile of the high pressure portion of the system. The low pressure is monitored by H140P, SUS/VERN HYD PR. Pressure surges in the sustainer system during ground to airborne switchover are detected by H1360P, HYD SUSTAINER RETURN.

Proper operation of the low pressure portion of the booster hydraulic system is determined by H224P, B HYD SYS LO PRESS, high pressure operation by H33P, B1 HYD ACCUMULATOR.

B. To determine that the hydraulic fluid is evacuated in the commit sequence, measurements H1187X, BSTR OIL EVACUATION and H1188X, SUST OIL EVACUATION are taken.

C. Due to a flight failure, further instrumentation is required for the hydraulic and propellant utilization systems. Therefore (H414P) PU VLV CLS SERVO has been added.

D. In order to determine whether or not the hydraulic fluid remains within specified temperature limits, measurements of the booster (H1T) and sustainer (H131T) pump discharge will be taken.

VIII. INTERMEDIATE BULKHEAD INSULATION REMOVAL STUDY

The removal of the insulation from the intermediate bulkheads on certain flights will result in additional heat being transferred into the LOX tank. In order to obtain information on the amount of heat transferred into the liquid oxygen, temperature stratification within the tank, and the quantity of gaseous oxygen present in the tank, a series of temperature measurements (F97T, F371T, F773T through F779T) (F374T through F377T, F780T through F783T, F786T) will be installed in and on the LOX tank, A temperature measurement at the LOX tank helium inlet (F771T) will establish helium inlet conditions and in conjunction with an orifice type flowmeter consisting of differential pressure (F1147P) and ambient temperature (F146T) and pressure (F6P) instrumentation in the LOX tank helium pressurization line, will determine the amount of helium used to pressurize the LOX tank.

Due to the heat lost from the fuel tank into the LOX tank, a greater quantity of helium is required to pressurize the fuel tank. The amount of helium going to the fuel tank will be measured by an orifice type flowmeter which utilizes differential pressure (F34P) and ambient temperature (F17T) and pressure (F212P) measurements in the fuel tank helium pressurization line.

The object of this insulation removal study is to establish the quantity of gaseous oxygen and helium used to pressurize the main propellant tanks. This information will determine the desirability of permanently removing the insulation bulkhead on all future Atlas flight articles to optimize flight trajectories.

To simplify design tasks, release procedures and avoid confusion with similar measurement numbers assigned for the LOX ullage study, F92T, F93T, F94T, F95T, and F96T have been deleted.

IX. PNEUMATIC REGULATOR STUDY

(D) Fourteen (14) measurements are added as part of the E series pneumatic study. The purpose of these measurements is to obtain accurate inflight data of vibrational input at the regulator mounting base and on the regulator. This data will be used to supplement laboratory testing to establish vibrational specification

The transducers are Gulton KA-1000 G systems, composed of an A-395 TMU-1 accelerometer and a FT-521U amplifier. These are a piezoelectric type with a nominal sensitivity of 833 MV/G. The amplifier gain is variable from 5 to 50. The complete system sensitivity is flat to ± 3% over the temperature range of -50 to +185 DGF, and has a cross-axis sensitivity of less than 5%. The ranges are plus to minus 30 G's with frequency response to 1200 CPS. The telemetering is being accomplished by the "burst" technique over channel C. The "burst technique" is implemented by connecting a series of commutator pers together. Channel C is commutated at 1/8 rps and the output from each accelerometer is monitored for approximately 1 second every 8 seconds.

X. FLIGHT CONTROL

A. Autopilot

These measurements are being made to checkout and validate the satisfactory condition of the Autopilot Programmer prior to launch. Inadvertent switching

occurred on similar packages during D "AIG" flight testing. Recorded data of the checkout will provide information on timing and individual peculiarities of the package.

MEAS NO.	DESCRIPTION
ADD	
S1370X	STAGING DISCRETE
S1371X	BOOSTER JETTISON COMMAND
S1372X	PRESSURIZE VERNIER HYDRAULIC SYSTEM COMMAND
S1373X	BOOSTER ENGINES CUTOFF COMMAND
S1374X	SUSTAINER ENGINE CUTOFF COMMAND
S1375X	VERNIER SOLO HYDRAULIC PRESSURIZATION SYSTEM BACK-UP
S1376X	VERNIER ENGINES CUTOFF COMMAND
S1377X	EJECT RE-ENTRY VEHICLE COMMAND
S1378X	RE-ENTRY VEHICLE JETTISON COMMAND
S1379X	FIRE RETROROCKETS COMMAND

B. Instrumentation of the high power switches is required to isolate and correctly diagnose possible failures of the programmer, electrical harness and pyrotechnic squibs. To obtain this data the following sequence measurements have been added: (D)

ADD

S373X	BOOSTER CUTOFF
S374X	SUSTAINER CUTOFF
S376X	VERNIER CUTOFF
S379X	FIRE RETROROCKETS
S391X	THOR RETROROCKET COMMAND

C. An accelerometer-switch being flown open loop initiates a backup booster staging command. To further test and achieve confidence in this unit two telemetry measurements (S353X) BOOSTER STAGING B/U and (S385V) ACCEL 400 CYCLE CONT have been added.

D. S151X TANK FRAG DESTRUCT. This measurement has been added to establish via telemetry that the destruct signal has actually been sent by the programmer.

E. The roll program is accomplished by ARMA signal, which function is monitored by measurement I529V. Therefore measurement S1049V, PROGRAMMER ROLL SIGNAL has been deleted.

F. M79A, MISSILE AXIAL ACCELERATION. A fine range measurement (plus to minus 0.5G's) is being made to provide information on small changes in acceleration caused by sustainer thrust decay, vernier engine performance, cutoff characteristics, R/V unlatch and retrorocket firing. The transducer is a Donner force balance servo system, transistorized, internally biased, requires a 28 VDC power supply and has a 0-5 volt output.

XI. GUIDANCE

I1607Q, ASC HETRODYNE FREQ and I1528V, YAW STEERING SIG are effective at AMR only for missiles launched from complex 11. I1601V, 400 CPS REFERENCE and I1606V, COMPUTER RESET are effective on the Series E missiles launched from other complexes. COMPUTER RESET monitors the voltage which permits the computer to accept accelerometer signals and starts the sequence of computer operation; it is a convenient time reference to be used with measurement I1510W, ELAPSED TIME.

D

XII. TRACKING

A. Flight data on Missiles 9E and 13E indicate that vibration levels on the boom antenna and the rate beacon-impact predictor were considerably higher than expected. Measurements located on different sections of the General Electric equipment to permit more extensive analysis of the problem are (G196O) PB-IP RADIAL, (G595O) PB WAVEGUIDE RAD, and (G587O) POD WAVEGUIDE.

B. Due to the complexity in making and calibrating measurement Z?E, KLYSTRON POWER OUTPUT, it has been deleted.

XIII. DECOY (RESEARCH POD)

General

This pod will be used to test various research type decoys, especially those of a size or shape which cannot be evaluated with the R&D decoy pods. Attachment fittings presently being built into Atlas missiles will be utilized in mounting the research pod.

A. System Description

The research pod consists of a single launch tube 12" in diameter and 60" long mounted through a gimbal system to a base support structure. The forward end of the launch tube is protected by an aerodynamic fairing which also contains the major components of the pod electrical system. The decoy weight which may be accommodated is limited principally by the maximum recoil force transmitted to the missile attachment weldments. Thus, decoys somewhat heavier than those considered in the present design may be used if low ejection speeds can be tolerated.

The aerodynamic fairing is made in two parts. The lower part is a structural member transmitting aerodynamic and ejection loads into the missile. The upper portion of the fairing is a nonstructural member and is ejected from the pod prior to launch tube orientation which permits near hemispherical orientation.

B. Operation

The sequence of pod operation events is as follows:

1. After proper completion of the missile boost and sustainer acceleration, the system is placed in an armed condition.

2. The upper portion of the fairing is ejected with a squib actuated device and the launch tube latch is released enabling the launch tube to orient.

3. The launch tube orients to the correct polar and azimuth location by either an electric motor actuator or by a gimbal spring.

4. After sufficient time has elapsed to insure correct orientation, the signal to fire the ejection device is given.

5. The canister is freed from its connection to the launch tube and is ejected. For moderate ejection velocities of about 30 to 40 ft/sec, an explosive actuated ejection device will be used. For low velocities a spring ejection system, which is released by the firing of a squib, will be used.

(D)

C. Instrumentation

1. Measurements Y103X, Y104X, Y105X and Y106X, will be made to monitor operation of the arming and timing unit

2. Y150X, FAIRING RELEASE, Y155X, TUBE UNLATCH, Y151X, UNLATCH SIGNAL, Y152X, MOTOR START, and Y153X, EJECT SIGNAL will be determined by monitoring various relays in the Junction Box.

3. Y154X, LAUNCH TUBE ORIENTATION will be picked up by a potentiometer connected to the orientation mechanism.

4. Y141X, EJECT SURE and Y102L, EJECTION VELOCITY will be monitored by use of microswitches mounted in the launch tube.

5. To study pod heating profiles during the max Q and max heating portions of flight Y158T, TEMP B IN FAIRING, Y159T, TEMP C IN FAIRING, Y160T, TEMP D IN FAIRING and Y161T, TEMP A IN FAIRING have been added.

XIV. AEROSPACE GROUND EQUIPMENT

A. Four measurements have been added to determine that proper sequencing of the LOX slug transfer values occurs:

MEAS NO.	DESCRIPTION
ADD	
N1356X	SLG CHG LO_2 LOW LEVEL
N1932X	LO_2 TPNG VLV CLOSED
N1933X	LO_2 TPNG VLV CLOSED
N1979X	PRESS VLV CLOSED

B. Because there is no further test data needed on LOX transfer units at AMR N1314T and N1338X have been deleted.

INTRODUCTION

I. GENERAL

This report describes the instrumentation of SM-65-E Series R&D (Atlas) missiles to be flight tested at the Air Force Missile Test Center (AFMTC), Cape Canaveral, Florida. All launchings will be made from Launch Complexes No. 11 and No. 13.

In general, the Series E R&D missiles are similar to the Series D (AIG) R&D missiles flown during the latter portion of the series D program. Primary innovations on series E missiles include the MA-3 rocket engine system, redesigned propellant feed ducting, sustainer engine gimbaling at staging, free-launch (no holddown), Lot IV inertial guidance, redesigned propellant level control system, new pneumatic regulators, redesigned fuel and LO_2 staging valves, and structural changes required to accommodate these differences. These changes and the various series E systems are described in detail in the Flight Test Program, SM-65E Series Missiles, Convair Report AZC-27-005. (B)

Milestones to be accomplished during the program are the initial evaluation of the Series E R&D basic configuration, demonstration of operational capability and reliability, and special flights for evaluation of broader operational capabilities.

The purpose of the series E flight test program is to provide data for the accomplishment of the following six missions:

1. Basic Series E missile evaluation.
2. Circular error of probability evaluation.
3. Maximum range inertial guidance evaluation.
4. Maximum range weapon system demonstration.
5. Weapon system reliability evaluation.

Details pertaining to these six basic missions are described in the Flight Test Program, SM-65E Series Missiles, Convair Report AZC-27-005. Detailed objectives for each of the series E R&D flight missiles will be described in the Flight Test Plan issued each individual missile.

II. FLIGHT TEST PROGRAM INSTRUMENTATION PHILOSOPHY

The selection of instrumentation to support the flight testing of the Atlas vehicles has been approached primarily as a system problem. Its purpose is to determine whether the various vehicle systems as a whole operate adequately in the flight environment.

In general then the flight test instrumentation is not designed to check individual component design adequacy. (This is accomplished in component and systems testing.) Should a failure occur in flight it may be necessary to resort to laboratory or captive testing to determine the cause.

III. DEFINITION OF TEST INSTRUMENTATION AND DATA CATEGORIES

Evaluative Instrumentation - that instrumentation required to support test objectives.

Operating Instrumentation - consisting of redline and design limit measurements which are required by site personnel to monitor critical parameters during checkout, precount, and countdown operations.

Failure Analysis Instrumentation - any of the Series E program measurements may, in the event of particular types of failure, become useful in failure analysis. Therefore measurements not specifically assigned to the above two categories are automatically classified as failure analysis instrumentation.

Telemetered Data - intelligence which will be sensed by elements on the vehicle and transmitted by RF link to a ground receiving station for recording.

Landline Data - intelligence which will be sensed by elements on both the missile and ground support equipment and transmitted over a direct wire system to recorders.

Range Data - intelligence which is requested from the missile test range authorities. The actual method of acquisition is left to the discretion of the range authorities.

Internal Data - defined as that data which is generated by measuring instruments aboard the vehicle being tested. Included in this category are all measurements acquired to evaluate missile system performance; all measurements acquired to determine the environment in which the missile system operates, operating measurements, and general malfunction analysis measurements.

Tracking Data - defined as that data which is acquired by systems or instruments located on the ground and permits determination of position and velocity of the vehicle. Included in this category are: fixed camera, theodolite, radar, Azusa, Minitrack, Trace, and radio telescope, etc.

Support Data - defined as that data which cannot be classified as internal or tracking but is of the nature which supplements internal and/or tracking data. Included in this category are: all data gathered to determine the performance of the ground support equipment and site facilities, weather, time, still photographs, movies, launch coordinates, chemical analysis of fuels, computer outputs, etc.

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DESCRIPTION OF MISSILE AND GSE INSTRUMENTATION

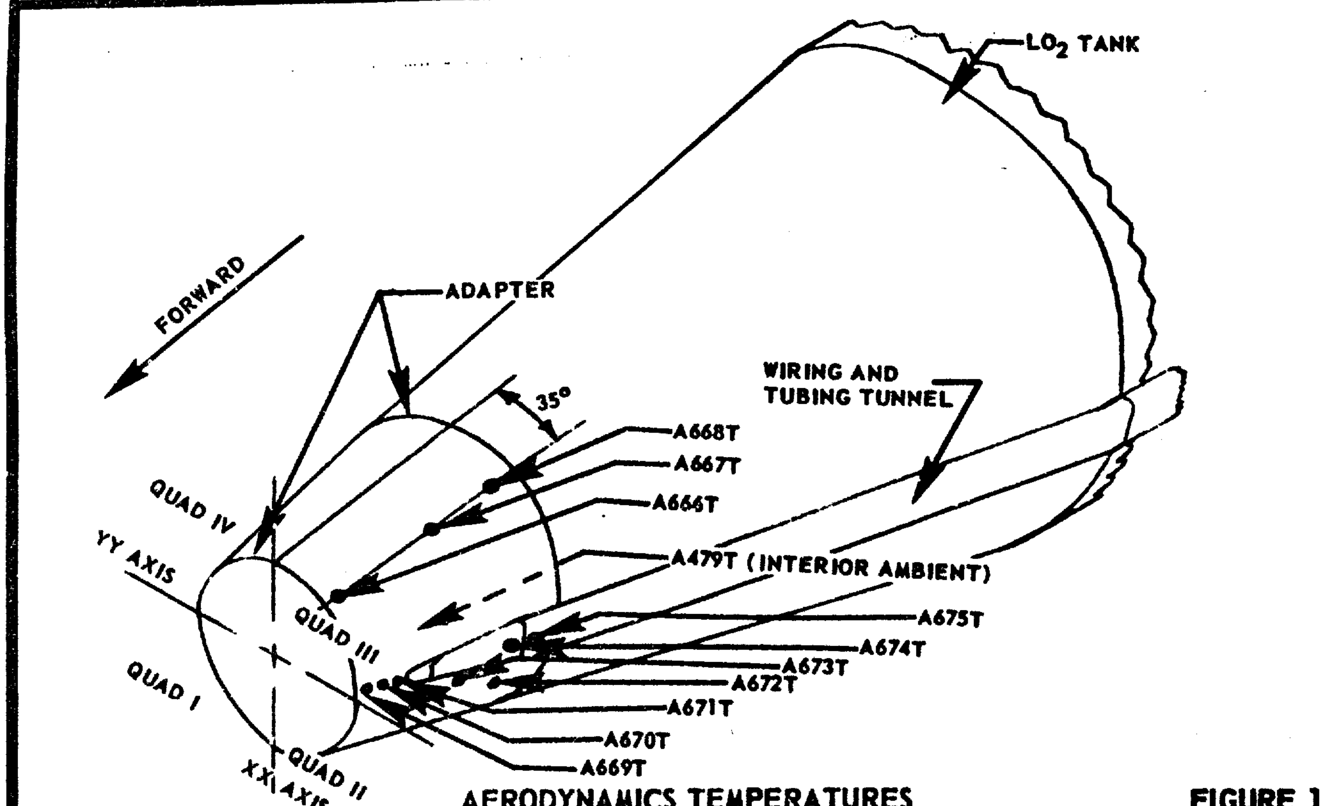
I. AIRFRAME INSTRUMENTATION

Airframe instrumentation includes measurements which will yield data on airframe separations (stagings), and general environmental conditions. Particular areas of interest include temperature, vibration, staging mechanism operation, and fire detection.

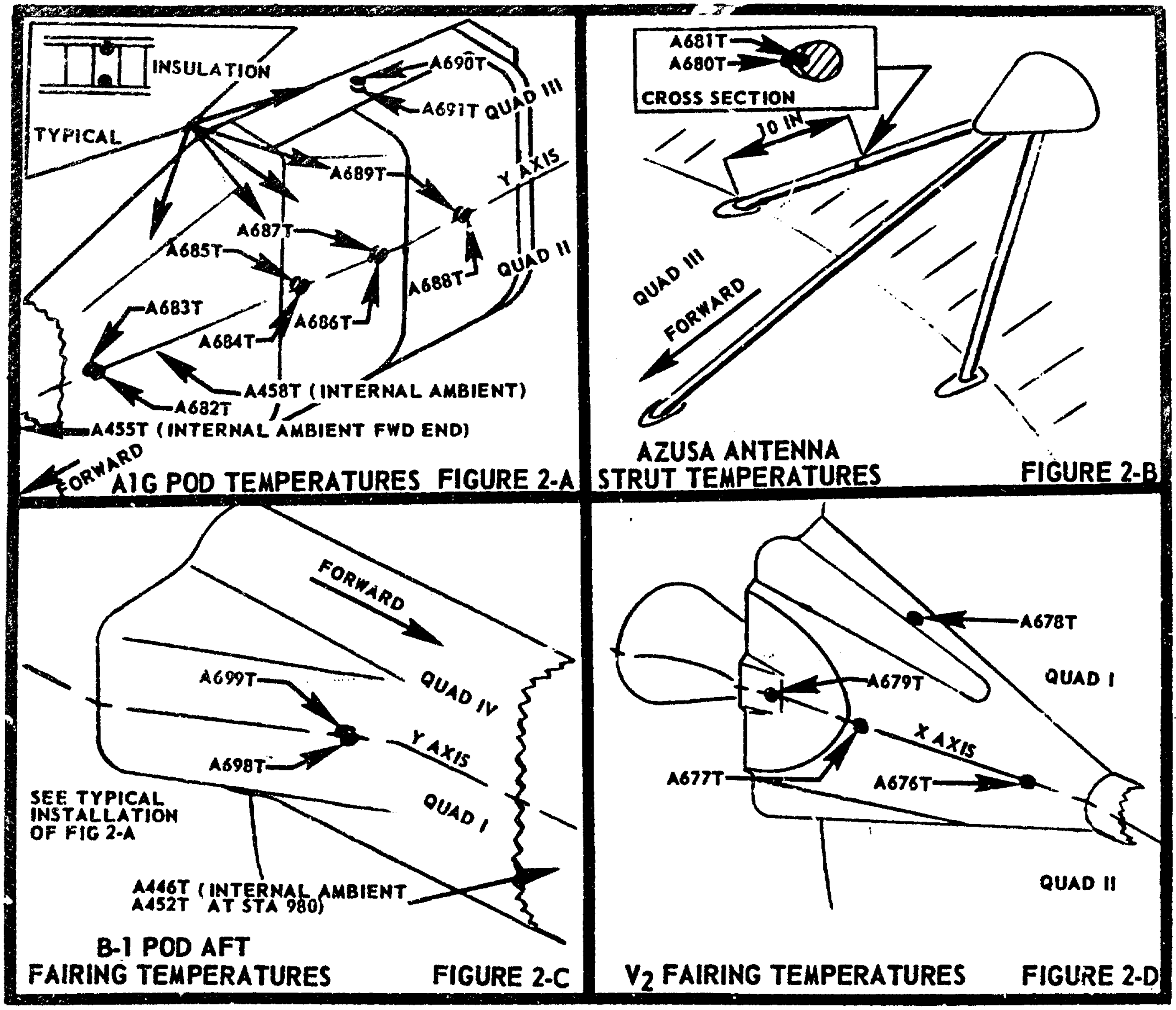
B

A. Temperature Measurements

As of this date temperature measurements are planned for studies of guidance equipment, engine area and LO_2 tank interior. In addition, because of extensive changes of the "E" series from the "D" series; a broad temperature survey has been proposed. An ECP (Engineering Change Proposal) has been submitted to the Air Force covering this survey. The following discussions cover both existing and proposed temperature measurements. The tabulations in this report reflect only the approved measurements.



AERODYNAMICS TEMPERATURES FIGURE 1



A1G POD TEMPERATURES FIGURE 2-A

AZUSA ANTENNA STRUT TEMPERATURES FIGURE 2-B

B-1 POD AFT FAIRING TEMPERATURES FIGURE 2-C

V_2 FAIRING TEMPERATURES FIGURE 2-D

1. Aerodynamic Heating

a. General

Heat resulting from friction and compression of the air molecules in the boundary layer adjacent to the surface of the missile, is transferred to the missile skin. The strength of the stainless steel, which is used as the basic structure of the propellant tanks, is a direct function of the temperature. Also, the helium requirements for tank pressurization are related to aerodynamic heating of the tanks. (B)

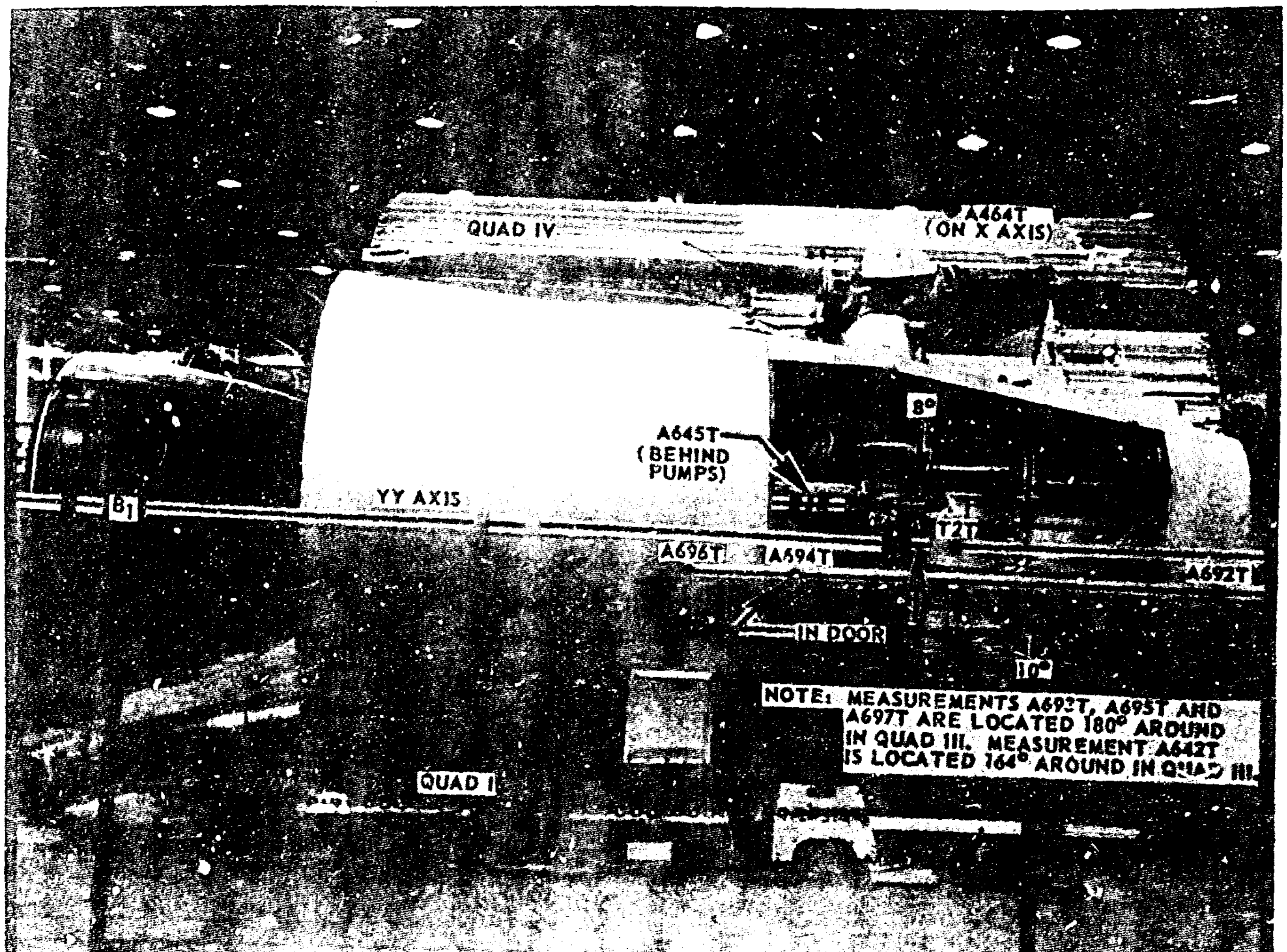
For analytical treatment of aerodynamic heating, heat transfer coefficients are formulated. This theoretical approach gives an indication of the rate at which heat is being transferred to the skin of the missile.

To validate theoretical temperature simulations, flight test temperature measurements on critical areas of the missile surface have been proposed. Areas of investigation have been selected to establish an over-all temperature profile. Information on the tank skin temperatures is needed to verify the interaction of complex shockwave phenomena about the new fairing configurations.

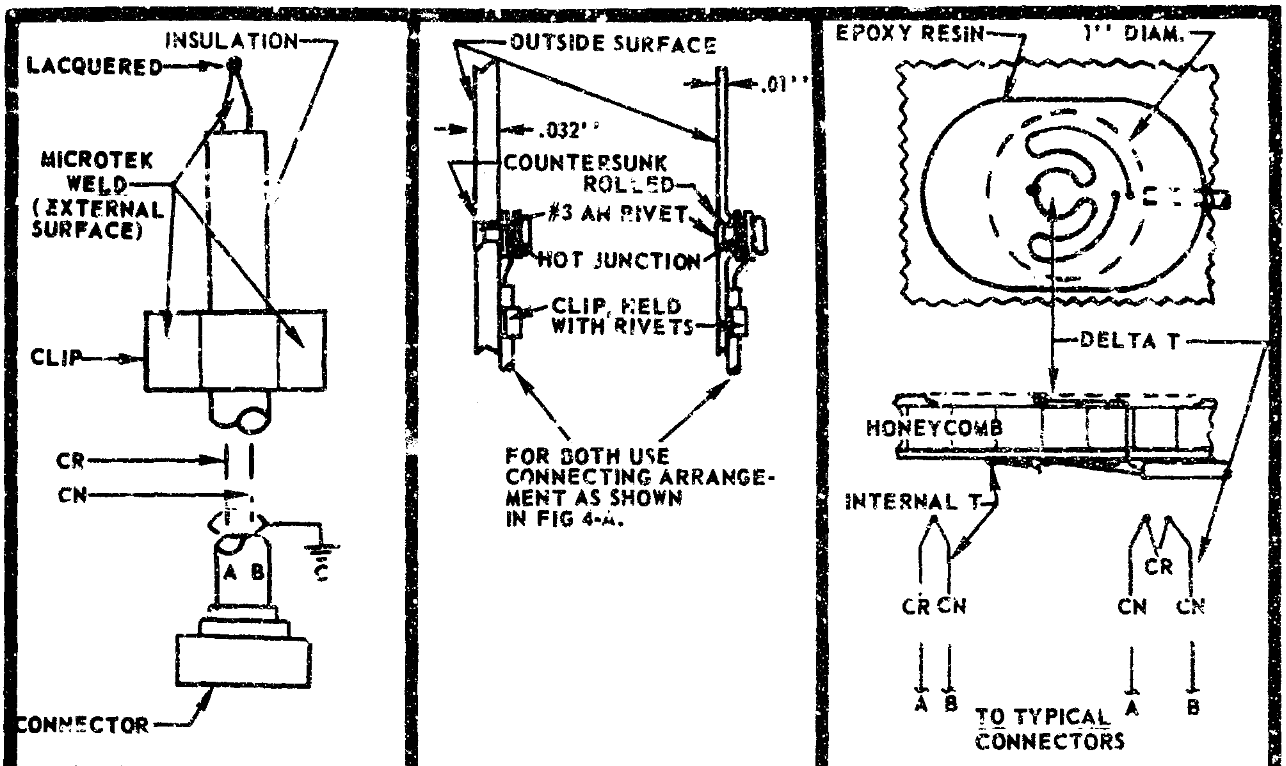
b. Measurements Planned

The following "E" series aerodynamic temperature measurements are included in the proposed ECP.

Three (3) measurements (A666T, A667T, A668T) are on the adapter. Seven (7) measurements are on or near the wiring and tubing tunnel fairing. Refer to "figure 1" for locations.



ORIENTATION OF BOOSTER SECTION TEMPERATURES FIGURE 3



TYPICAL THERMOCOUPLE ON STEEL

FIGURE 4-A

TYPICAL THERMOCOUPLE ON ALUMINUM

FIGURE 4-B

TYPICAL THERMOCOUPLE ON FIBERGLASS

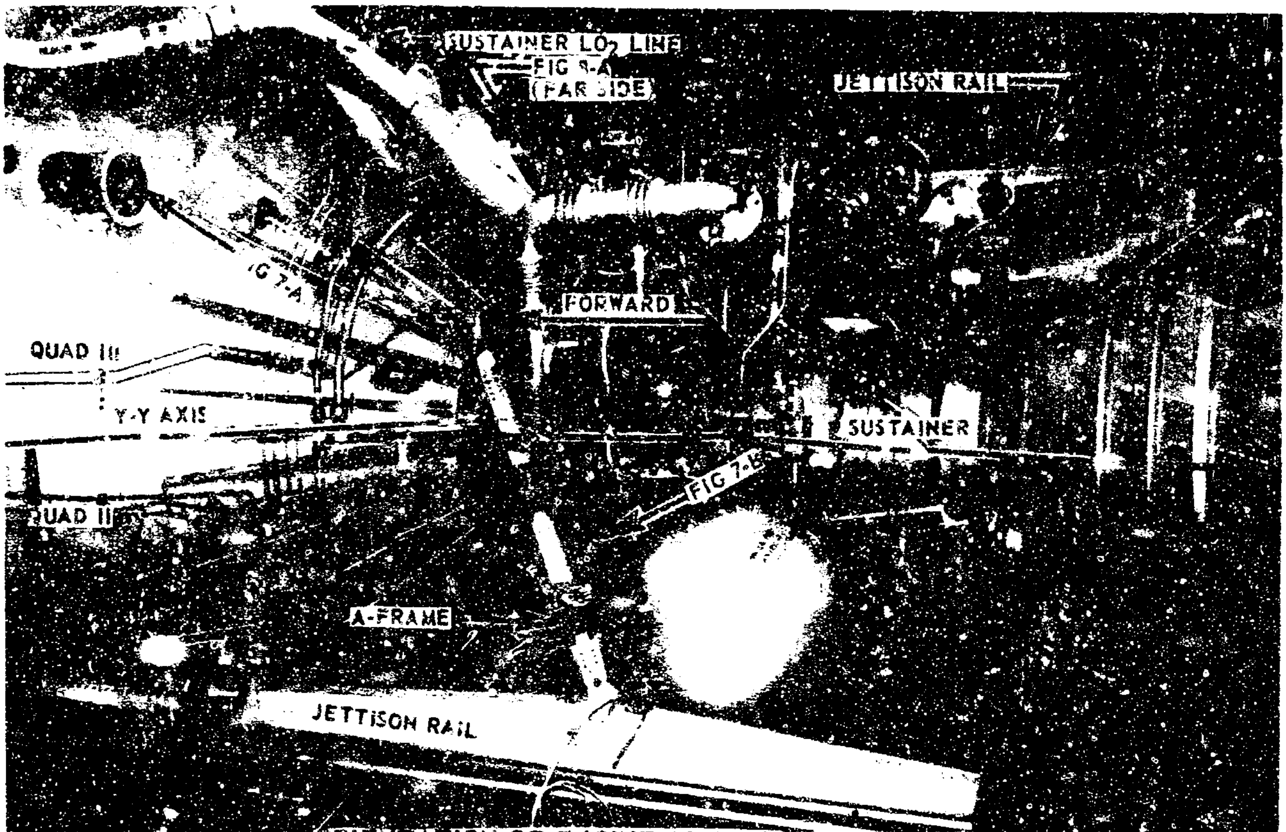
FIGURE 4-C

Aerodynamic heating on the AIG pod will be indicated by measurements (A682T, A683T, A684T, A685T, A686T, A687T, A688T, A689T, A690T, A691T). These would provide temperatures on the inside and outside edge of the pod cover insulation at five (5) different points. See "figure 2-A" for locations.

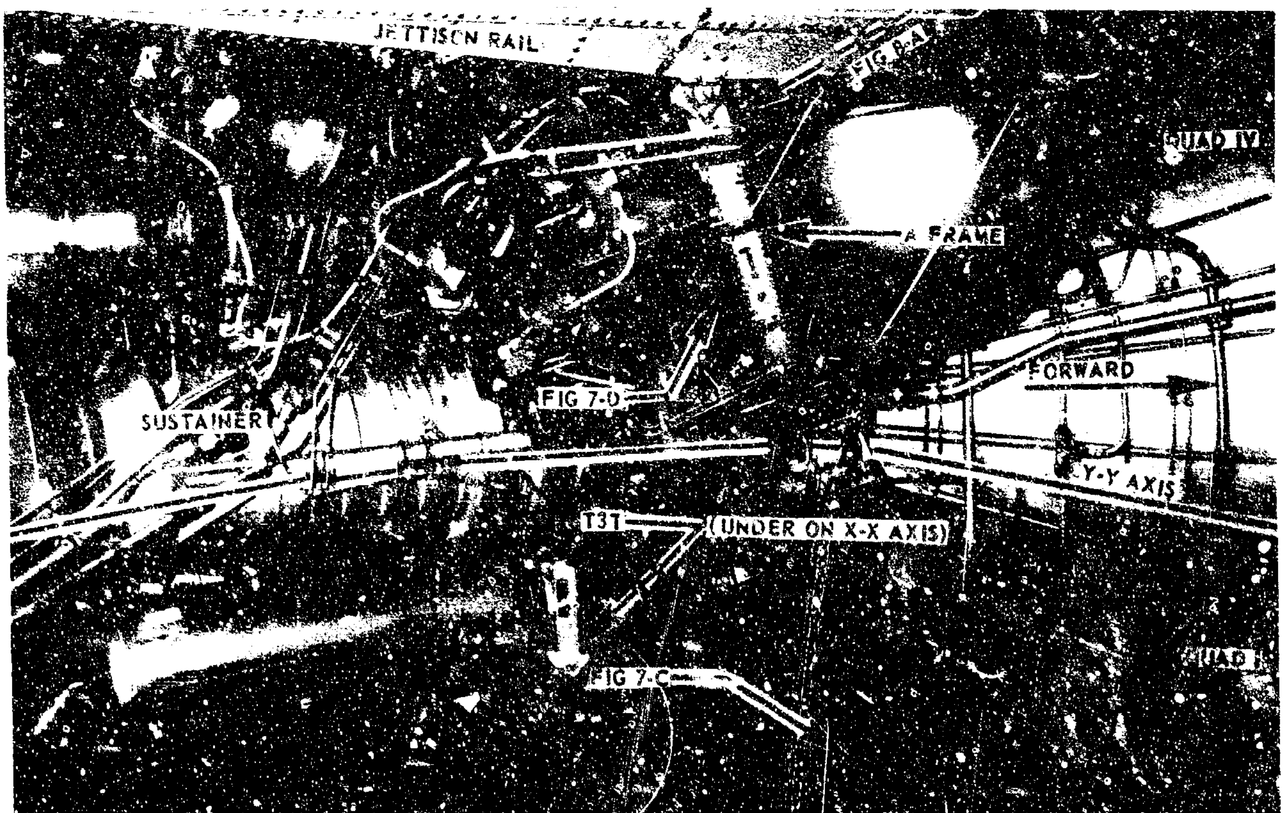
The effectiveness of the laminated fiberglass fairing on the Azusa boom antenna to withstand aerodynamic heating, will be indicated by measurements (A680T, A681T). See "figure 2-B" for locations.

Temperatures on the B-1 pod aft fairing and the V-2 vernier fairing will be monitored by measurements (A698T, A699T) and (A676T, A677T, A678T, A679T) respectively. "Figures 2-C and 2-D" indicate transducer locations. Ⓑ

Booster nacelles and nacelle doors will have measurements (A692T, A693T, A694T, A695T, A696T, A697T) on the outside glue line of the insultation honeycomb. Also one thrust structure skin temperature measurement (A464T) will be made. "Figure 3" indicates the locations of these transducers.



ORIENTATION OF ENGINE AREA TEMPERATURES FIGURE 5



ORIENTATION OF ENGINE AREA TEMPERATURES FIGURE 6

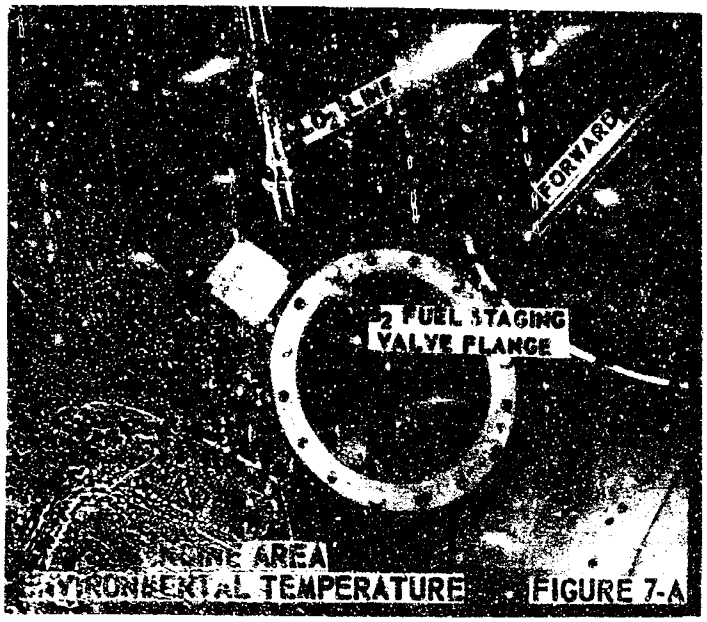


FIGURE 7-A

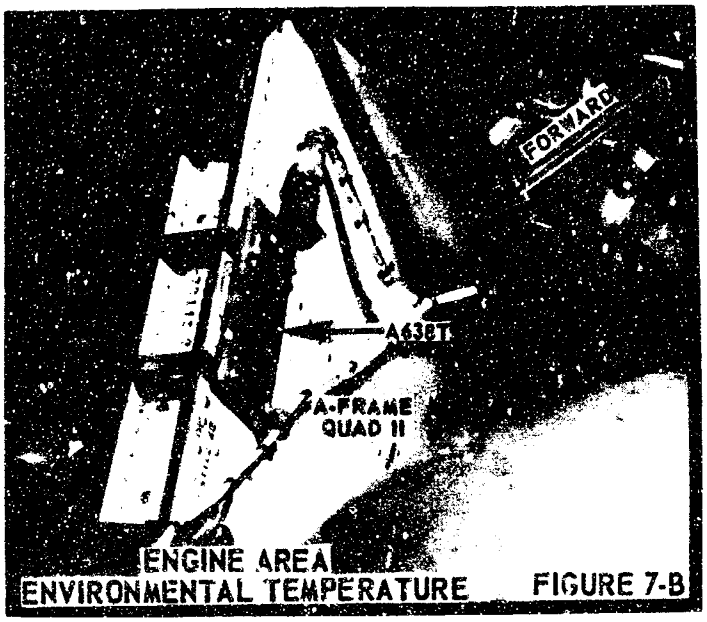


FIGURE 7-B

c. Instrumentation Techniques

In cases where the temperature to be monitored is on the tank skin (steel), chromelconstantan thermocouples are spot welded on. The advantage of this is the direct contact with the skin. Disadvantages are the protrusion into the airstream and a possible source of error from the reference junction.

When the chosen location is on aluminum (adapter, booster thrust section), the two junction wires are held between washers on a rivet.

The installation of thermocouples on fiberglass (fairings, nacelles, etc), is accomplished by removing fiberglass, inserting the hot junction and refilling with epoxy resin.

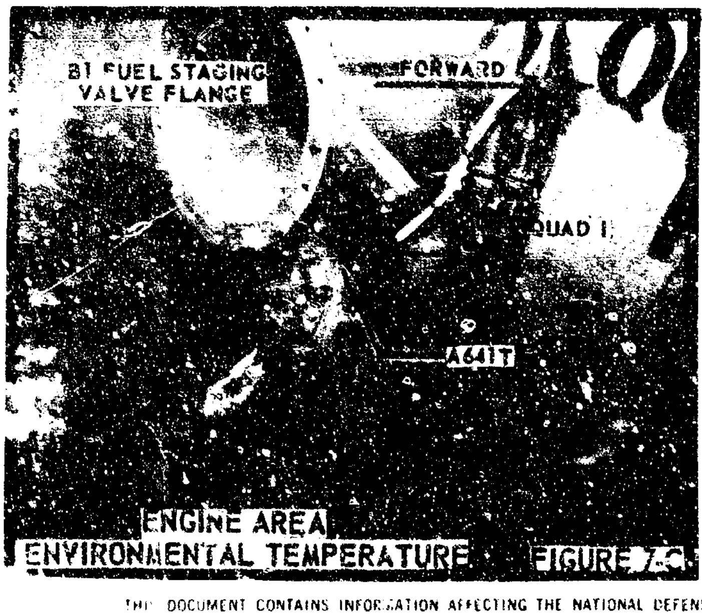


FIGURE 7-C

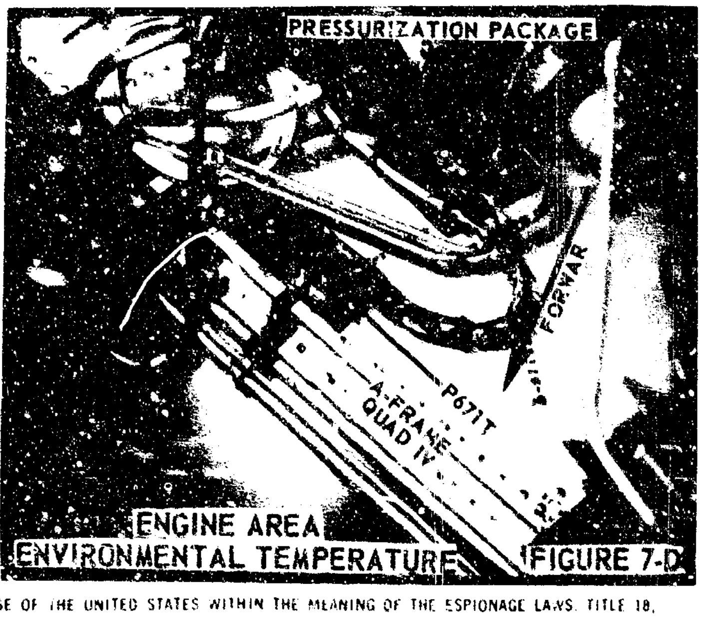
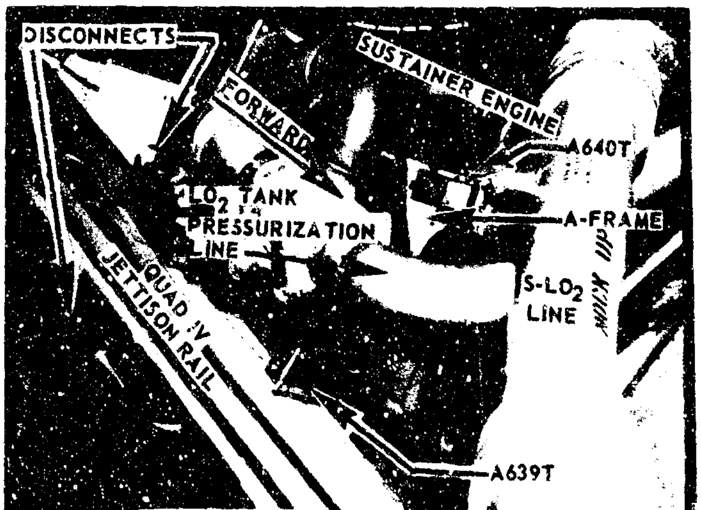


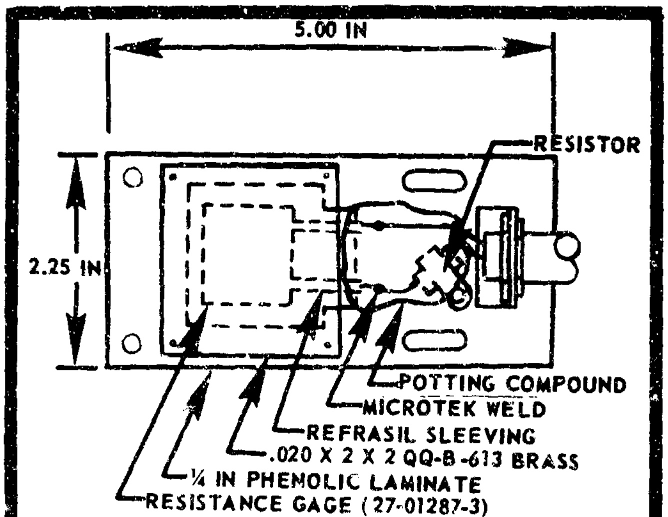
FIGURE 7-D

Refer to "figures 4-A, B and C" for typical installation details.

Because of the large number of temperature measurements planned and proposed for the "E" series missiles, special telemetry capability will be required. It is planned to use individual magnetic amplifiers for measurements on the first four flights. Beginning with flight five, it is planned to use one or two low level channels each employing one d-c pulse type amplifier. Each channel will have the capability for approximately 24 measurements. The number of channels will be determined by overall requirements for low level measurements. (B)



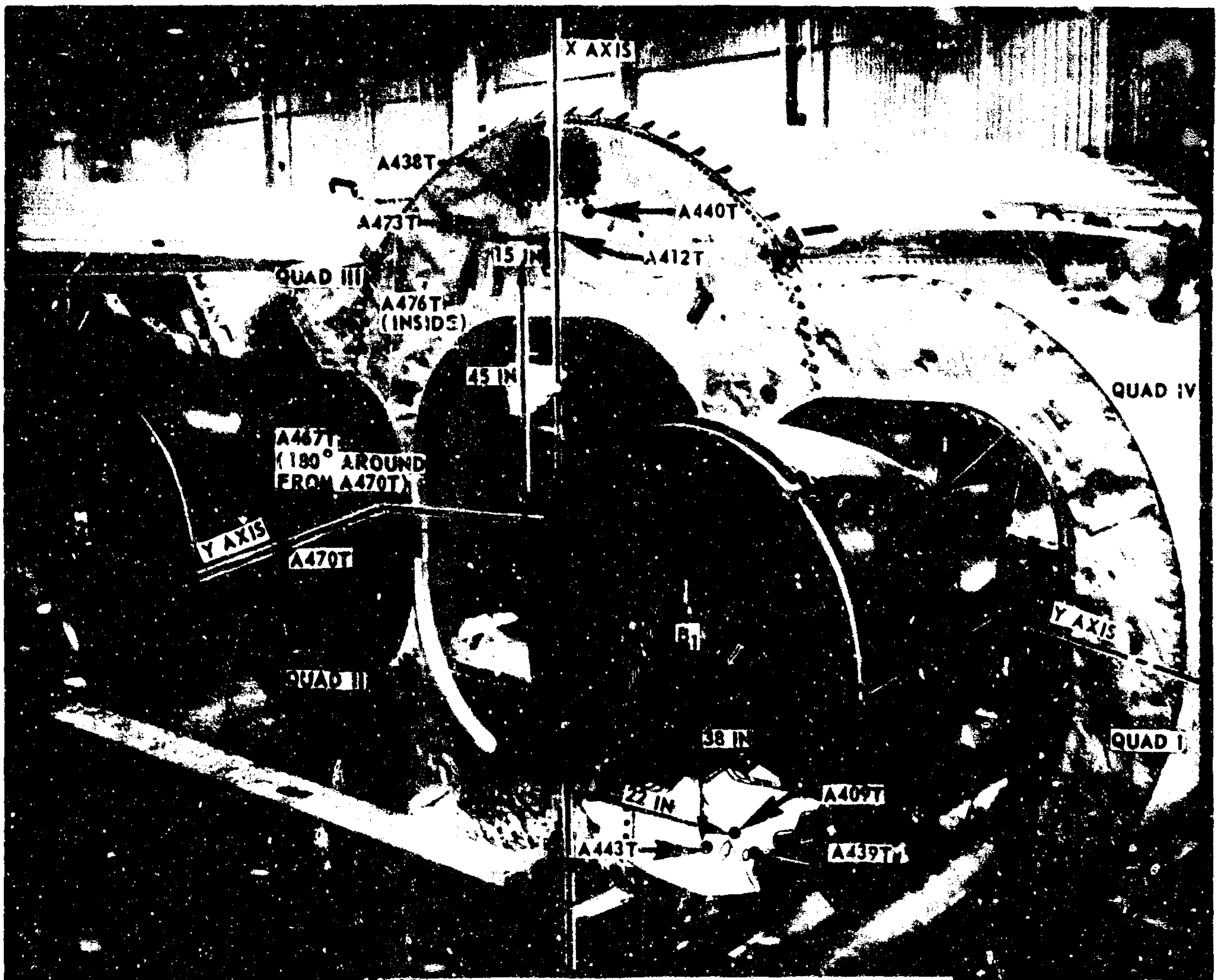
ENGINE AREA ENVIRONMENTAL TEMPERATURES FIGURE 8-A



TYPICAL AMBIENT TEMPERATURE ASSEMBLY FIGURE 8-B

One disadvantage to this method is that on any one flight, the maximum range spread of all the measurements are limited by the gain of the amplifier.

A reference junction is required to correct the final data from thermocouple measurements. The reference junction is designed and located so that it will remain near a constant temperature during flight. Two reference junctions will be used on "E" series missiles. Their temperature will be monitored on the first three flights to collect data for use with all thermocouple measurement data. See "figures 3 and 6" for locations of the sustainer area (T3T) and the B-1 area (T2T) reference junctions. (B)



ORIENTATION OF HEAT SHIELD TEMPERATURE FIGURE 9

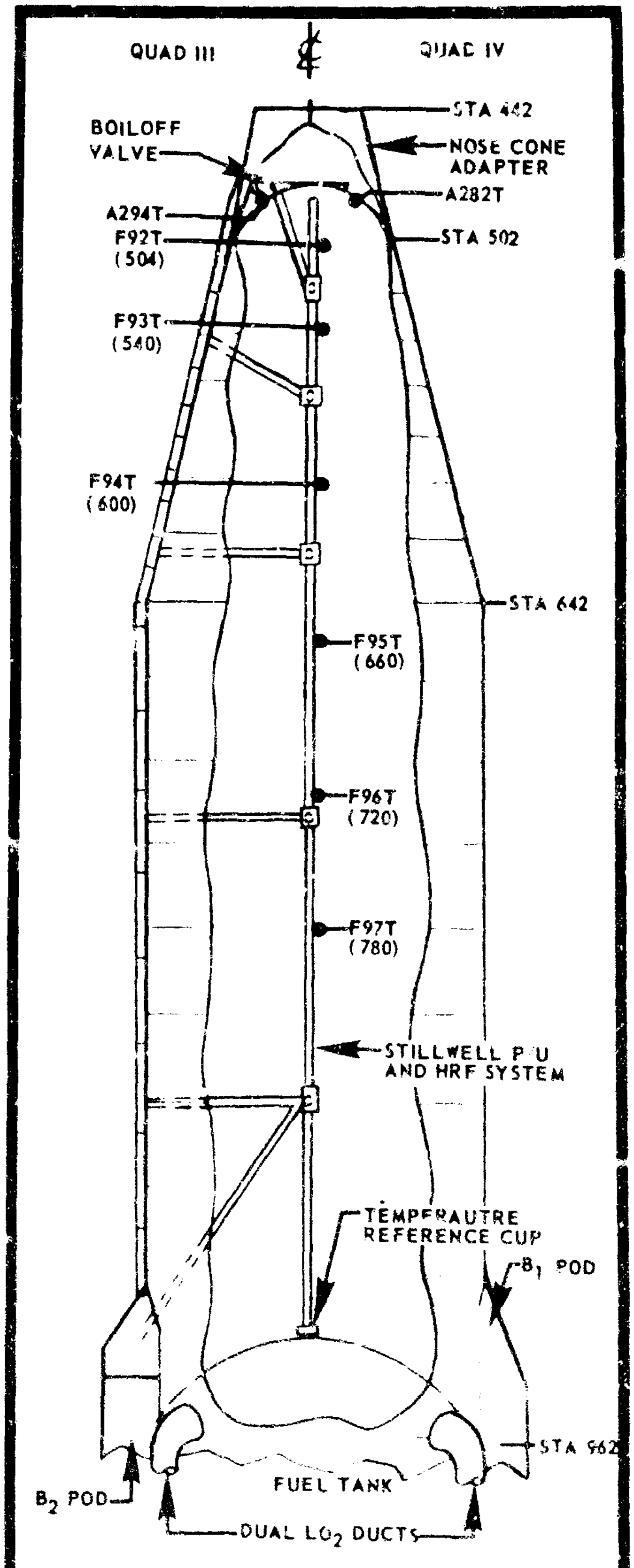
Each aerodynamic measurement is planned only for three flights. The resulting three sets of data will normally provide repeatability and a high level of confidence in the results.

2. Equipment Area Environment

a. General

Proper operation of the electronic equipment mounted in the pods will be greatly affected by the temperature in which it exists. Environmental heat is influenced by radiation of inner skin surfaces, radiation from self-heating missile components and by convection during periods of flight in atmosphere.

(B)



LO_2 TANK TEMPERATURES FIGURE 10

b. Measurements Planned

Five measurements will be made on guidance components to confirm that they are in an acceptable operating environment. These measurements are on Gyro 1 (I531T), Gyro 2 (I532T), the Binnacle (I533T), the Analog Signal Converter (I534T) and the Computer (I535T). Five other equipment area temperatures are included in the proposed temperature survey. Measurement (A479T) is proposed for the payload adapter section. This will provide information on the ambient temperature which payload mechanisms must operate. Measurement (A446T, A452T, A455T, A456T) are proposed in the cable fairing area, B-1 pod, B-2 pod and AIG pod respectively. The measurement in the cable fairing area is intended to provide an indication of temperature at the telemetry wiring tray. The pod area ambients will furnish data on equipment environments and some insight on the effectiveness of the insulation protecting the pods. (B)

Refer to "figures 1, 2-A and 2-D" for approximate locations of the proposed measurements

c. Instrumentation Techniques

Guidance equipment temperatures are installed by ARMA and a conditioned signal is provided to CV-A.

CV-A environmental temperature measurements will be made with platinum resistance gages. These are attached by an adhesive to the object

being measured. In the case of ambient temperatures, they are mounted on a piece of brass which is in turn insulated from its attachment point. The brass is used to provide thermal inertia and reduce false indications from radiant sources.

The gage forms one leg of a bridge circuit, the output of which is made compatible with the amplification system used.

See "figure 8-b" for a typical ambient installation. (B)

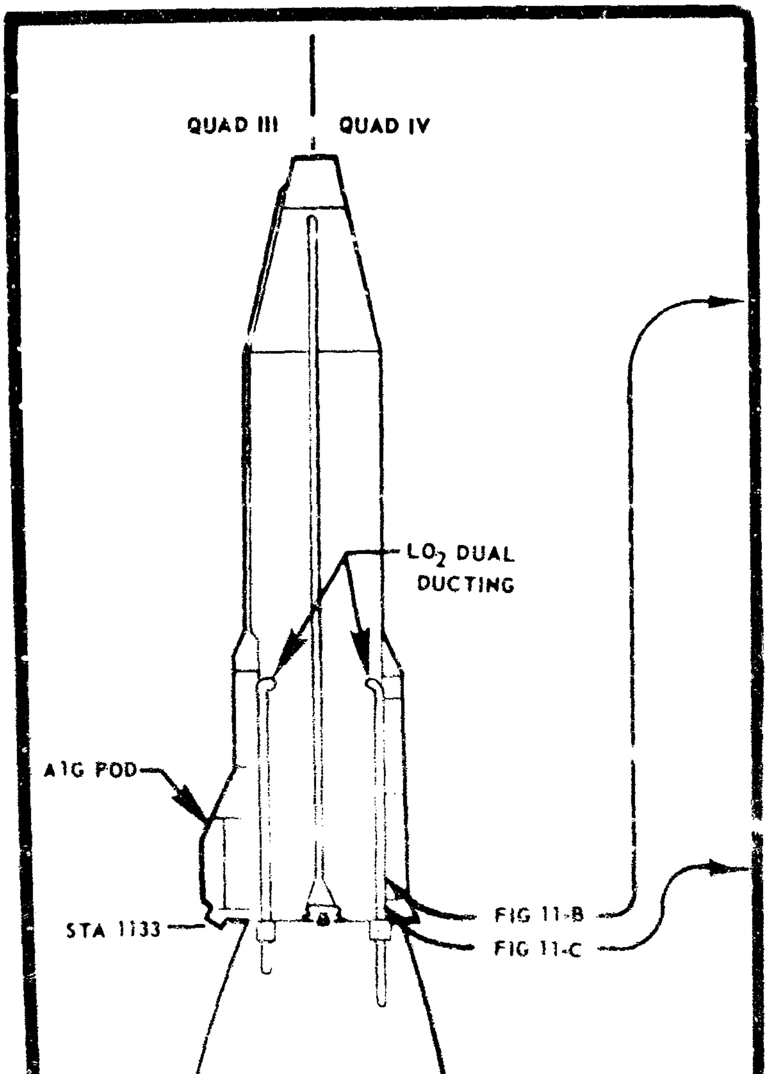
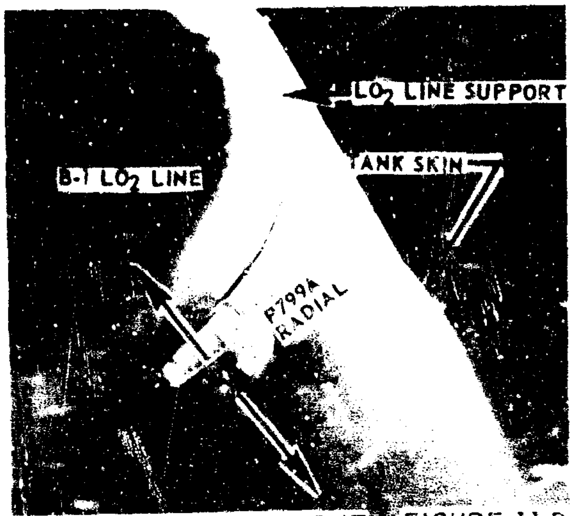
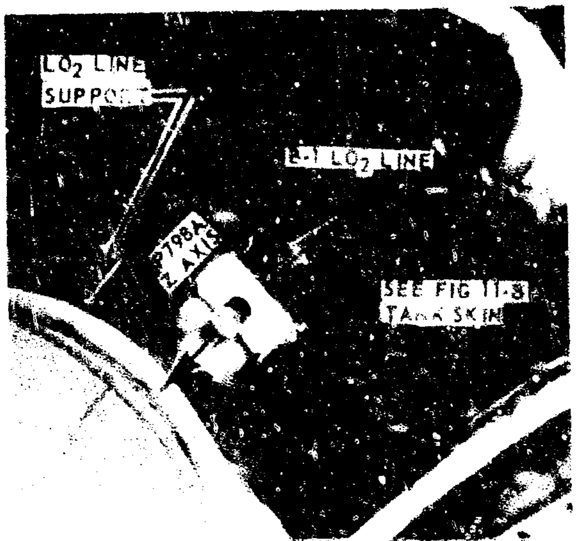


FIGURE 11-A
VIBRATION MEASUREMENT ORIENTATION



VIBRATION MEASUREMENT FIGURE 11-B



VIBRATION MEASUREMENT FIGURE 11-C

3. Engine Area Environment

a. General

Environmental temperature can also greatly affect the proper operation of the hydraulic, pneumatic and propulsion equipment.

On "E" series missiles, the new MA-3 engines and associated changes in hardware location, could considerably alter temperature characteristics in the thrust section. The re-located turbopump exhaust and the changes in the heat shield are areas that should be studied to determine their effect on engine area environment.

In addition to providing environmental information, engine area ambients could provide correlation of random malfunctions such as propellant leaks or fires.

b. Measurements Planned

Eight thrust section ambient temperatures will be made on the first five flights (A488T, A638T, A639T, A640T, A641T, A642T, A645T, P671T). Measurements (A638T), on the aft side of the A-frame in quadrant II, and (P671T), on the aft side of the A-frame in quadrant IV, will be made on all flights. See "figures 7-b and 7-d" for locations. Since the booster gas generators and boost pumps are heat sources, ambients (A642T, A645T) will be located near them. Refer to "figure 3" for locations. (B)

Details of location for the remaining ambients are shown in "figures 7-a, 7-c and 8-a." "Figures 3, 5, 6 and 9" indicate approximate locations for all planned and proposed engine area temperatures.

Eleven measurements in this area are included on the ECP to the Air Force. Each measurement is proposed for three flights. They are all intended to evaluate special area of interest.

Six calorimeters, four gold and two black, are proposed (A409T, A412T, A438T, A439T, A440T, A443T), on the aft side of the heat shield. These measurements will provide information on base region heating. Because of the additional turbopump exhaust, new data is needed to determine the convective film coefficient, amount of radiation and partially evaluate the heat shield. To complete the evaluation of the heat shield, measurements (A473T, A476T) would be made on the aft and forward side respectively.

The engine exhaust jets are a source of heat input to the engine surface. Measurements (A467T, A470T) on the "hat section" of the engine surface will provide data on the amount of heating present.

See "figure 9" for locations of the above proposed measurements. To obtain information on the ability of the vernier heat shields to protect the internal components, measurement (A461T) is proposed on the aft side of vernier 1 heat shield.

c. Instrumentation Techniques

As previously discussed under equipment area environment, ambient temperatures will be made with platinum resistance gages on brass mounted with thermal isolation. See "figure 8-b" for a typical installation.

In cases where the expected temperature range exceeds 900 DGF thermocouples are used. These will be used in the manner discussed in "Instrumentation Techniques - Aerodynamic Heating", section I. A. 1. c of this report. Refer to "figures 4-a, 4-b and 4-c" for typical installation.

The calorimeters will be a metal block with a built-in thermocouple. In all of the above cases the resulting transducer output will be conditioned to make it compatible with the planned amplification system for telemetry. (B)

4. LO_2 Tank Ullage Gas Temperature Study

a. General

During the course of a flight LO_2 tank pressure is maintained by helium and some unknown amount of gaseous oxygen.

From a standpoint of burnout weight it is desirable to minimize helium requirements and the amount of gaseous oxygen.

In addition ullage gas temperatures effect boiloff rates, payload environment and seals in the pneumatic system.

b. Measurements Planned

Two measurements (A282T, A294T) will be made on the forward bulkhead. Six measurements (F92T, F93T, F94T, F95T, F96T, F97T) will be made

at six different station levels near the center of the tank. These measurements are scheduled for four missiles. See "figure 10" for locations.

Helium flow rate data into the LO_2 tank will be obtained to support this study. Measurements (F65P, F147P, F146T) will be made for this purpose. Refer to "Supporting Systems Measurement", section IV of this report of additional details on helium flow rate instrumentation.

c. Instrumentation Techniques

The two bulkhead temperatures will be monitored by resistance gages. The six in-tank measurements will be made with thermopiles (two thermocouple junctions each) attached to the stillwell.

The resulting signals will be conditioned for telemetry in a manner similar to those discussed in previous sections of this report.

One significant difference will be the use of LO_2 as the reference temperature. This will be accomplished by installing a "cup" on the bottom of the stillwell to retain LO_2 near the end of flight. (B)

B. Vibration

1. Low Frequency Vibration (0 to 50 CPS)

No low frequency accelerometers are planned for "E" series flight missiles.

2. High Frequency Vibration (20 to 2000 CPS)

a. General

The performance of electronic and light mechanical components is influenced by the environment created by high frequency vibrations. The combustion processes of the engine and aerodynamic turbulence act as sources for vibrations which are transmitted through the airframe.

Since the "E" series missiles are different from previous missiles, extensive vibration studies will be made. Primarily these studies will be made on captive test articles. However current planning calls for airborne instrumentation in two special areas of interest. These areas are: the guidance equipment and the LO_2 ducting near the staging valve.

Possible expansion of this to include other areas is presently under consideration.

b. Measurements Planned

Concern has been expressed on forces imposed on the LO_2 ducting when the staging valve closes. Pressure surges resulting from the valve closure may be excessive. Two measurements, (P798A, P799A), will be made on the B-1 LO_2 line. These measure axial and lateral acceleration respectively. The data obtained will be used to verify design calculations and to initiate design changes if required. See "figures 11-A, B and C" for installation details.

Six measurements are planned on the first four missiles on the guidance equipment. These will be made on the computer (I5640, I5650, I5660) and on the binnacle (I5600, I5610), I5620). Data from these measurements will aid in the evaluation of guidance equipment operation and, since these same measurements will be made on D-AIG missiles, will provide information for comparison of D and E series vibration characteristics.

(B)

c. Instrumentation Techniques

The LO_2 duct measurements will be made with a Gulton KA-1006 system, composed of an A-395TMUC accelerometer and a FT-521U, amplifier, has been selected. The accelerometer is a piezoelectric type with a nominal sensitivity of 41.6 MV/G. The amplifier gain is variable from 5 to 50. The complete system sensitivity is flat to ± 3% over the temperature range of -30 to +185 DGF, and has a cross-axis sensitivity of less than 5%. The range will be ± 60 g's with response to 100 cps.

The guidance equipment measurements were scheduled to be made with Glennite Model A40TM triaxial accelerometers. However due to problems encountered with this unit on D-AIG missiles a change is expected. The A40TM is a case isolated, bender type, crystal accelerometer with a 7 mv/g nominal output over the desired accelerometer range. It is linear to ± 3% over the frequency range of 3 to 3 KC, under a termperature environment of -65° F to 180° F. These accelerometers, and the required signal conditioning, will be provided and installed by ARMA.

This data will be transmitted on a 1/8 rps commutator with the segments connected so that each measurement will be monitored for one second

every eight seconds. The recorded information will be analyzed by both CV-A and ARMA.

C. Staging Instrumentation

Booster staging is initiated from the guidance system as a discrete command which is telemetered (I570X). The force for releasing the staging latches is obtained from the pneumatic controls bottle. Bottle pressure (F145P) and the command to the conax valve (M32X) are monitored. To establish that similtaneous release of all latches occurs, a micro switch is mounted on each latch (illustrated in Figure 12). As the latch unhooks, each micro switch initiates an electrical signal, (measurements M84X, M85X, M86X and M87X).

To verify that separation occurs properly the relative motion between the missile and the booster section is monitored. A "fishing reel" type potentiometer (M113D) is mounted on the sustainer stage with one end of the reel wound wire attached to the jettisoned stage. As the reel unwinds during separation, the resistance of the potentiometer varies as a function of separation. The potentiometer makes one complete revolution for each eight inches of separation. The output signal is there for a sawtooth wave each cycle of which represents eight inches of separation. (B)

Supporting information for booster separation will be obtained from guidance acceleration data.

D. Fire Detection

The knowledge that an open flame existed is not particularly valuable information unless the cause or source can be pin-pointed. Often, the pressure drops associated with leaks or small line ruptures are too insignificant to be detected on associated instrumentation. Consequently, a fire detection device which can indicate location and perhaps give a clue to magnitude is an asset for failure analysis. To know whether a line rupture or wiring failure gave rise to a fire or were the result of a fire is invaluable for failure analysis.

Missile-borne temperature measurements, in addition to providing system evaluation and performance data, can in cases indicate adverse temperature conditions which are the result of a fire. However, a system designed specifically for fire detection is the most practical approach.

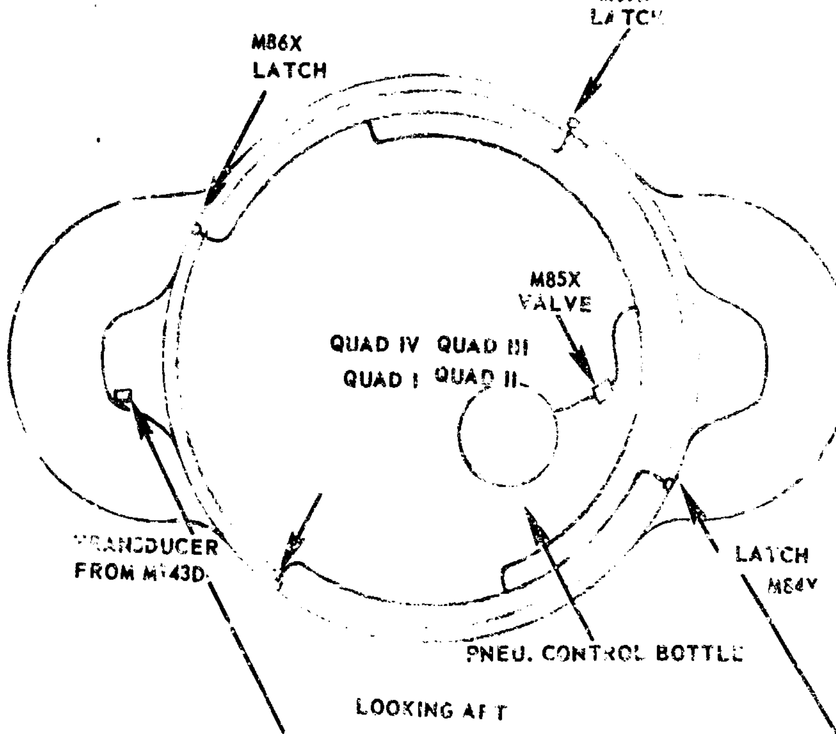


FIGURE 12-A

FIGURE 12-B

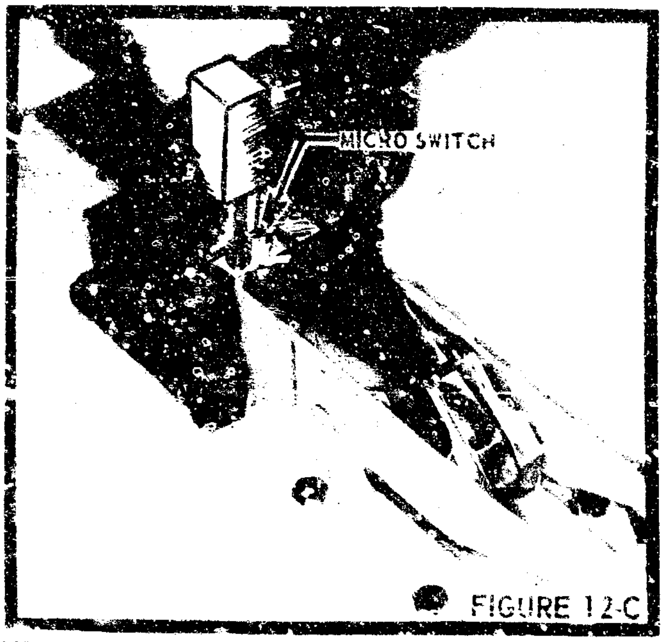


FIGURE 12-C

BOOSTER STAGING INSTRUMENTATION

In considering a system for fire detection, an array of thermocouples strategically placed provide a relatively good picture of ambient conditions. The limitation for flight articles is the number of telemetry channels required.

E flight missiles will have four landline measurements for engine compartment temperatures at firing P1710T, SE ENVIRONMENT (Quad 2 near sustainer hydraulic pump); P1711T, B1 NACELLE AMBIENT (Sta 1200 Quad 4 near the accessory pad drive); P1712T, B2 NACELLE AMBIENT (Sta 1200 Quad 2 near the accessory pad drive); P1325T, ENG COMP AMBIENT (Quad 4 on A-frame near the pressurization package). Eight telemetered temperatures will give an indication of engine compartment ambient during flight. For locations, refer to illustration 7-3.

An additional system for flame detection is installed on E flight missiles. Six silicon cells are installed in the thrust section in two clusters of three. Each cluster is mounted on a booster engine LO_2 dome. The cell outputs in each cluster are summed and telemetered. The cells are positioned such that they "look" toward the following areas:

B1 cluster - A2851

Cell 1 - B1 gas generator
2 - B1 gimbal
3 - Sustainer gas generator

B2 cluster - A7441

Cell 1 - B2 gas generator
2 - B2 gimbal
3 - Helium bottles (quads 3 & 4)

The cells are calibrated such that 600 foot-candles on any cell represents 100% information band-width. In analyzing data from the cells, the following characteristics should be considered.

1. Output is low; this increase susceptibility to noise.

2. Sensitivity is not linear for radiant flux in the visible light bandwidth.

3. Transducer is temperature sensitive.

4. For a given radiant flux intensity, output varies with angle of incidence.

These measurements are also located in illustration 7-3.

At present, there are several new systems being evaluated for fire detection. They are ultra-violet sensitive and give positive indication of open flame. The

disadvantages of the solar cells have been overcome and it appears that one of these systems may alleviate the shortcomings of all presently used systems. (B)

II. PROPULSION SYSTEM MEASUREMENTS

The propulsion system can be conveniently subdivided into the areas of propellant pumping drive system, propellant flow, engine controls, engine performance, and propellant utilization. (B)

A. Propellant Pumping Drive System

At engine start the ignition of the solid propellant gas generator cartridges spin the turbopumps which bring the engines to full operating levels. These cartridges also ignite the propellants arriving at the three separate gas generators before burning out.

An orifice in each gas generator LO_2 line controls the LO_2 pressure and flow to the gas generators and, hence the engine power levels. Each gas generator LO_2 injection manifold pressure (P337P, P419P, P420P) is measured to ascertain proper performance. (B)

The gas generator hot gas temperatures (P709T, P713T, P714T) are monitored as these functions indicate gas generator performance and, therefore, the values of the turbine driving parameters. Turobpump speeds (P83B, P84B, P349B) and fuel pump discharge pressures (P38P, P39P, P330P) are measured as they are the end parameters in this area and are representative of the overall propellant pumping system operation.

B. Propellant Flow

During the booster and sustainer stages, liquid oxygen and fuel from the main tanks flow through individual turbopumps to each thrust chanber. The turbopumps increase propellant pressures to that required for adequate propellant injection. (B)

In order to assure that engine interface requirements are satisfied and to isolate failure analysis possibilities, the turbopump fuel discharge pressures (P38P, P39P, P330P), the LO_2 injection manifold pressures (P91P, P92P, P351P), and the sustainer turbopump LO_2 inlet temperature (P530T) and pressure (P56P) will be measured. (B)

The engine compartment ambient temperature instrumentation will help reveal if there is a leak in the LO_2 ducting during flight.

The sensitive and accurate turbopump speed measurements (P83B, P84B, P349B) will respond rapidly to varying pump inlet and outlet conditions. Thus these measurements will reflect turbopump cavitation very quickly. (B)

C. Engine Controls

In the MA-3 engine, only the vernier engine controls are pneumatically operated. Helium is supplied by the non-jettisoning helium controls bottle which connects to the vernier pressurization manifold and inter-stage separation fittings. (B) The manifold supplies pressure regulated helium to actuate the vernier propellant valves and to pressurize the fuel and LO_2 vernier feed tanks. The vernier pressurization manifold regulator discharge pressure (P474P) will be monitored on the first three flights to determine regulator performance in a flight environment. The controls helium usage will be computed for the first three flight articles from data gained by temperature (F290T) and discharge pressure (F145P) instrumentation in the controls helium bottle. The latter measurement (F145P) will be retained on all flight articles for failure analysis purposes. The vernier propellant tank pressures (P27P, P30P) will be monitored for pressurization timing and levels, and correlation with vernier engine performance.

The booster main propellant valves are controlled by fuel pump discharge pressure. The response and effectiveness of these valves will be indicated by the booster thrust chamber LO_2 injection pressure instrumentation (P91P, P92P).

Practically all the sustainer engine control valves are hydraulically operated. The actuating pressure (H140P) derived from the sustainer hydraulic system, will be monitored on all vehicles. (B) The sustainer main valve position (P528D, P529D), and gas generator (P337P) and thrust chamber (P351P) LO_2 injection pressure instrumentation will help reveal if the various sustainer control valves are operating properly.

In order to determine the timing of engine shutdowns, the various engine cutoff sequence functions will be monitored (P1155X, P1164X, P347X, P1546X, P547X, P548X). The engine start signals (P1161X, P1544X, P1545X, P1549X) are recorded to obtain a record of starting times and run durations.

D. Engine Performance

The most significant engine performance parameters are propellant mixture ratio, and engine thrust and specific impulse. Engine thrust calculations will be based on chamber pressure information (P6P, P28P, P29P, P59P, P60P) and engine coefficients obtained during acceptance tests. Missile acceleration data gained from the guidance system (I1515A, I516A, I517A, I1518A, I519A, I520A) will permit an analysis of engine thrust decay and specific impulse. An estimate of propellant mixture ratio can be gathered from PU system information (U80P, U81P, U91V).

E. Propellant Utilization System

Optimum range and trajectory dictate a minimum amount of unused propellants at the end of powered flight. The propellant mixture ratio also must be maintained within specified limits from the nominal value to insure smooth combustion and maximum thrust. Extensive P.U. analyses based on the above criteria have been made from previous flight test data and computer studies. Instrumentation on E series is limited to further verifying these studies, and to indicate any possible malfunction should such occur. (E)

The error sensed by the P.U. bridge after passing through the isolation amplifier and demodulator is recorded via telemetry. This voltage measurement (U91V) is proportional to the residual mixture ratio. When compared to the independent measures of propellant head (U80P and U81P), proper performance of the P.U. manometer sensors and associated bridge can be checked during the latter portion of sustainer flight.

The transfer functions in the P.U. computer will be verified by cor[illegible]ing the feedback voltage (P528D) to the error signal. Since P528D is a f[illegible]lve angle, it is also indicative of fuel flow rate.

The independent measurements of differential (propellant) head are ob[illegible] during the latter portion of the sustainer phase of flight only. Present planning is for these measurements (U80P and U81P), to be taken by 0 to 5 PSID reluctance type transducers teed in parallel to the manometer sensing lines. "Mechanical hysteresis" is minimized in transducers of this type with a corresponding improvement in data accuracy. It is estimated the change of slope of the data when 0 PSID is reached (port uncovering) will define the residual of either propellant within an uncertainty of 50 pounds.

Proper functioning of the Head Suppression Servo Controller can be verified from the relation of P. U. valve position and the sustainer main LO_2 valve (P529D). (B)

III. FLIGHT CONTROL SYSTEM MEASUREMENTS

Throughout powered flight, the control system provides attitude control while directing the missile along its predetermined flight path. Also, the control system performs the necessary sequencing at launch, staging, burnout and nose cone separation. At the same time, due to the natural aerodynamic instability of the missile, sufficient control must be provided to overcome the disturbing effects of extraneous forces encountered by the missile during flight.

The control system is conveniently separable into two major subsystems, the airborne autopilot system and the inertial guidance system.

A. Autopilot

1. General - The autopilot system has four basic functions:

a. To roll the missile to the proper azimuth during the initial vertical climb and to pitch the missile over into the proper trajectory prior to development of the inertial ballistic trajectory;

b. To stabilize the missile during powered flight;

c. Through acceptance of the pitch yaw and roll guidance commands, to correct for deviations from the proper trajectory; and

d. To provide pre-set switching functions including,

(1) command discrete acceptance, enable, and pre-set back-ups, (B)

(2) gain changes, and

(3) various subroutines.

The autopilot system for "E" series will function essentially in the same manner as it has for "D" series. However, the system has been repackaged and several components have been redesigned. A significant change in autopilot operation was necessitated by the incorporation of the MA-3 propulsion system. It is no (B)

longer necessary to null the sustainer engine at staging since on the MA-3 engines there is adequate clearance, therefore the sustainer will gimbal throughout staging. The autopilot programmer has been redesigned and is now all electronic, however, it still provides the same functions and performs the same operations as before. The only change in the gyro package is the addition of a roll torquing amplifier. In the servo can, pitch, yaw and roll filters have been added. There are also new all electronic filters incorporated to replace the old electro-mechanical integrators. The filters use the operational amplifier technique of a d-c amplifier having an input and a feedback network that provides the same frequency response that electro-mechanical integrator and stabilization filter provided. The servo amplifier has remained unchanged. The entire autopilot system has been repackaged into rectangular shaped units utilizing printed circuitry to accomplish weight saving and more efficient space utilization. The rectangular shaped packages have magnesium castings with aluminum covers. The flight programmer has no moving parts and the reliability has been increased with the incorporation of printed circuitry. The weight of the flight programmer, however, has increased slightly. (B)

2. Measurements Planned

To prove the capability of the autopilot system to perform the required functions, autopilot testing will be emphasized in the flight testing of the missile. The instrumentation provided for this purpose is described below, with the measurements discussed by their natural groupings.

a. Rate Gyro Signals (S52R, S53R, S54R)

These are measurements of the voltage output of the roll (S52R), pitch (S53R) and yaw (S54R) autopilot rate gyros. This output is proportional to the angular velocity of the missile, and is the means through which dynamic stability of the missile is achieved in flight. These measurements actually provide a time history of missile stability during flight. Transients, limit cycle sloshing build-up, and other instabilities are all reflected in the information.

To provide isolation of the control system from the telemetry system, each rate gyro biases an emitter follower to produce a signal for telemetering. Since the output of the rate gyros is an amplitude modulated, 400 cycle phase reversing AC signal, the output of the emitter follower also has these characteristics. Conversion of the signal is accomplished by routing the signal through a demodulating signal conditioning network.

The conditioned signal is then telemetered on the FM/FM Channels 1.8, 1.9 and 1.10 on all E flights. (B)

b. Displacement Gyro Signals (S61D, S62D, S63D)

These measurements reflect missile angular displacement about a preset reference in the roll (S61D), pitch (S62D) and yaw (S63D) channels. (B) Position control of the missile is controlled through these gyros, which may be torqued by either the guidance system, or by the flight programmer.

Although the output of these gyros is a position command signal, the units actually sense a rate of displacement about the reference. This is integrated within the package to obtain a position signal output. As in the case of the rate gyros, the telemetry signal is obtained from an emitter follower whose output is proportional to the displacement gyro output. Since this is a phase reversing, 400 cycle amplitude modulated signal, it is demodulated and signal conditioned to make it compatible with the telemeter. The information is cross-connected on a commutator to give 20 samples per second.

c. Thrust Chamber Positions (S203D, S204D, S205D, S206D, S222D, S223D, S233D, S234D, S256D, & S257D) (B)

These are measurements of the output of the flight control system, and as such, are important for gross malfunction and failure analysis. The booster and sustainer thrust chamber deflections are sensed by linear potentiometers, one in each plane of gimbaling freedom which are shaft coupled to the gimbal block. Since 5 VDC is applied across each potentiometer, the output of the transducers vary between 0 and 5 VDC as the thrust chambers gimbal between their stops. The outputs are then routed through conditioning circuitry. On all E missile flights, the B1 (S203D, S205D) and sustainer (S256D, S257D) engine position measurements are (B) telemetered on continuous channels, while the B2 (S204D, S206D) engine position information is commutated at 60 samples per second. (B)

The vernier (S222D, S223D, S233D, S234D) engine position movements are sensed by linear potentiometers which are mechanically linked to the vernier actuators. The pitch transducers have a full scale travel of 1.091 inches, and the yaw transducers have a full scale travel of 3.054 inches. 5 VDC is applied across each conditioning network to obtain a signal suitable for telemetering and then routed to RF2, Channel E, for time division multiplexing at 60 samples per second, prior to transmission.

d. Programmer Functions

The autopilot programmer receives discrete commands from guidance, acts upon them, and as a final result - performs switching to pass these or resulting command signals to the acting system.

On the "E" series missiles, three discrete commands are received from guidance. They are monitored as staging signal (1570X), sustainer cutoff (1522X) and vernier cutoff (1521X).

The staging signal initiates subroutine 1 in the programmer. Booster cutoff occurs 0.1 seconds later. This is monitored in a B1 cutoff relay closure in the NAA engine relay box (P547X). At 1.6 seconds after the staging discrete, a command opens the Conax valve allowing pneumatic pressure to operate the staging mechanisms. The command to the valve is measured as (M32X).

Sustainer cutoff discrete initiates subroutine 2 at the programmer and operates a relay in the NAA engine relay box. The operation of this relay is monitored as (P347X).

Vernier cutoff discrete initiates subroutine 3 at the programmer and operates a relay in the NAA engine relay box. This relay is instrumented as (P548X). Four seconds after VCO; a release payload signal (S248X) is sent.

B. Guidance

1. Functional Description

All E Series flight missiles will be guided by the ARMA All Inertial Guidance System. The Missile Guidance Set (MGS) is the Airborne

portion of the guidance system. The MGS consists of an inertial platform, control unit and digital computer. In addition, for R&D instrumentation purposes, analog and digital signal converters and an analog signal converter input filter unit are also utilized.

The inertial platform is precisely oriented by ground-based alignment equipment prior to launch. After the missile is launched, gyros in conjunction with a servo system are utilized to maintain this orientation of the platform with respect to inertial space. Accelerometers, located on the platform sense the acceleration of the missile in three orthgonal directions. These values of acceleration are corrected to include gravitational acceleration and then integrated in the airborne digital computer for computation of yaw steering commands, the Range Error Function (REF), and the Crossrange Error Function (CEF).

The MGS generates steering commands from launch throughout powered flight but these signals are not enabled by the Autopilot programmer until appropriate times in flight. A fine-roll control signal is provided by the MGS platform azimuth resolver. This signal is used to correct the autopilot roll program from T + 16 to T + 19 seconds. The MGS pitch gimbal resolver output is fed directly to the autopilot to control the missile pitch attitude after booster staging. The Crossrange Error Function (CEF) is computed from accelerometer outputs and is stored in the computer until after booster staging. After staging the accumulated CEF in combination with subsequent calculations of CEF is fed into the autopilot as a yaw steering command.

Four discrete commands, staging, sustainer engine cutoff, vernier engine cutoff and warhead pre-arm, are generated by the MGS. When the downrange velocity exceeds a predetermined value the staging discrete is commanded. The REF computed from the accelerometer data is the basis for the generation of the staging, sustainer engine cutoff and vernier engine cutoff. Providing that the operational flight safety function of the computer predicts a generally correct impact the computer commands warhead pre-arm. (B)

2. Accelerometer Output Measurements (I513A, I514A, I516A, I517A, I519A, I520A) (B)

Three vibrating string accelerometers are installed on the stable platform. Each accelerometer contains a sensitive mass which is held in position by

two vibrating strings and centering tapes. The frequency of each of the accelerometer strings is approximately 4480 cps in a "O" G field. As acceleration increases, the frequencies of the two strings vary inversely with respect to each other at rate of 64cps/G (32cps/G/String). To avoid transmitting the 4480 cps signals directly, the Y (I1516A, I519A) and Z (1517A, I520A) axis accelerometer outputs are heterodyned with a 4100 cps signal in the analog signal converter (ASC) before being telemetered. ⊢Ⓑ

If the string frequencies go below 4150 cps and are heterodyned they are attenuated greatly and are of no value. This then allows for string frequencies equivalent to approximately 11 G acceleration to be heterodyned. It has been calculated that acceleration in the X direction may momentarily exceed 11 G's due to high acceleration in the X direction (downrange), noise, vibration, missile acceleration characteristics, and characteristics of the platform shock mounts. In addition in order to reduce the string frequency data accurately, both string frequencies of each accelerometer must be telemetered directly or both must be heterodyned with the same frequency before being telemetered. Therefore, the two string frequency measurements from the X accelerometer (I513A and I514A) are not heterodyned but are telemetered directly. ⊢Ⓑ

The string frequencies of each accelerometer are fed directly into the airborne computer. In the computer the sum and difference in CPS between the two string frequencies of each accelerometer is used to calculate missile vector velocity, position and steering functions. ⊢Ⓑ

The basic equation used is:

$$V_{x,y,z} = K_{x,y,z} \; Fs_{x,y,z} \; Cd_{x,y,z}$$

Where $V_{x,y,z}$ is the instantaneous velocity $\dot{x}, \dot{y},$ or $\dot{z}$ in ft/sec

$Fs_{x,y,z}$ is the sum frequency in CPS of the X, Y, or Z accelerometer

$Cd_{x,y,z}$ is the total counts of difference frequency (CPS X time) of X, Y, or Z accelerometer from t=0. ⊢Ⓑ

The constant $K_{x,y,z}$ is in ft/ $\left[\sec^2 \; (CPS)^2\right]$ = ft/cycle^2 of the accelerometer in question.

3. Digital Measurements

The following computer functions are sampled and transmitted in digital form via the telemeter.

Computed missile X position and X vector velocity (I505H, I502L)

Computed missile Y position and Y vector velocity (I506H, I503L)

Computed missile Z position and Z vector velocity (I507H, I504L)

Range Error Function (I508H) (B)

Crossrange Error Function (I509H)

Elapsed Time (I510W)

These 9 measurements are serial, binary non-return-to-zero words. The complete sequence is shown in the Inertial Guidance Digital Word Structure Schematic. The smallest repeatable pattern is a cycle recurring every 0.5 second and each cycle is divided into 8 similar sequences of about 1/16 second duration. A start pulse precedes each cycle and a sequence start pulse of 5580.4 u seconds precedes each sequence. All words are contained in each sequence except CEF which is inserted during sequence 6. However, each sequence is the same length. Each word is 20 bit (non-return-to-zero) and each bit is about 140 u seconds long. The data word is 17 bits and the other 3 bits are used for marking the start of the word, indicating the sign and indicating the word parity (total data word sum is odd or even). Words X, Y and Z are repeated each sequence but change only once per cycle. T and REF may change each sequence.

The measurements themselves are sampled from the computer and the pulses stretched and conditioned in the Digital Signal Converter. Their output impedance is 14K and the signal level will vary between 0.5V and 5V. The velocity and position measurements will be compared with external tracking data (i.e., Azusa, Mod III Trajectory Instrumentation and Strobe Light) to verify the accuracy of the guidance computer outputs. In (B) addition, as stated in the discussion of the accelerometer measurements, the airborne computer output measurements will be compared with values computed independently in a ground computer.

The following table presents the value represented by each bit of each of the nine digital words. (B)

Bit Position	ft/sec $\dot{x}$ $\dot{y}$ $\dot{z}$	Sec T	feet x y z	Radians CEF	Radians REF T ⩽ SCO	Radians REF T ⩾ SCO
1.	← WORD MARKER PULSE →					
2.	2^{-2} .25	0	2^{6} 64	2^{-16} .000015259	2^{-12} .000244141	2^{-17} .000007629
3.	2^{-1} .5	0	2^{7} 128	2^{-15} .000030518	2^{-11} .000488281	2^{-16} .000015259
4.	2^{0} 1	0	28 256	2^{-14} .000061035	2^{-10} .000976562	2^{-15} .000030518
5.	2^{1} 2	2^{-4} .0625	2^{9} 512	2^{-15} .000122070	2^{-9} .001953125	2^{-14} .000061035
6.	2^{2} 4	2^{-3} .125	2^{10} 1024	2^{-12} .000244141	2^{-8} .00390625	2^{-13} .000122070
7.	2^{3} 8	2^{-2} .25	2^{11} 2048	2^{-11} .000488281	2^{-7} .0078125	2^{-12} .000244141
8.	2^{4} 16	2^{-1} .5	2^{12} 4096	2^{-10} .000976562	2^{-6} .015625	2^{-11} .000488281
9.	2^{5} 32	2^{0} 1	2^{13} 8192	2^{-9} .001953125	2^{-5} .031250	2^{-10} .000976562
10.	2^{6} 64	2^{1} 2	2^{14} 16384	2^{-8} .00390625	2^{-4} .0625	2^{-5} .001953125
11.	2^{7} 128	2^{2} 4	2^{15} 32768	2^{-7} .0078125	2^{-3} .125	2^{-8} .00390625
12.	2^{8} 256	2^{3} 8	2^{16} 65536	2^{-6} .015625	2^{-2} .25	2^{-7} .0078125

(B)

Bit Position	ft/sec $\dot{x}$ $\dot{y}$ $\dot{z}$	Sec T	feet x y z	Radians CEF	Radians REF T ⩽ SCO	Radians REF T ⩾ SCO
13.	2^{9} 512	2^{4} 16	2^{17} 131072	2^{-5} .03125	2^{-1} .5	2^{-6} .015625
14.	2^{10} 1024	2^{5} 32	2^{18} 262144	2^{-4} .0625	2^{0} 1	2^{-5} .03125
15.	2^{11} 2048	2^{6} 64	2^{19} 524288	2^{-3} .125	2^{1} 2	2^{-4} .0625
16.	2^{12} 4096	2^{7} 128	2^{20} 1048576	2^{-2} .25	2^{2} 4	2^{-3} .125
17.	2^{13} 8192	2^{8} 256	2^{21} 2097152	2^{-1} .5	2^{3} 8	2^{-2} .25
18.	2^{14} 16384	2^{9} 512	2^{22} 4194304	2^{0} 1	2^{4} 16	2^{-1} .5
19.	SIGN →					
20.	PARITY →					

NOTES:

1. Numbers less than 2^{-9} have been rounded off to 9 significant figures. CEF and REF computations will still be good to at least seven significant figures. B

2. The sum of all numbers less than 2^{-11} contribute only .2 milliradian to the REF and CEF computation. Therefore, except for CEF and REF values near zero, these numbers can safely be neglected for most purposes.

3. Time begins on the left, i.e., the word for $\dot{x}$ appears first in the DSC output after the sequence marker, followed by $\dot{y}$, etc., with REF being

the last word before the next sequence marker. Bit position is also read from left to right. That is, the least significant bits appear first.

4. Resolver Output Measurements (I529V, I530V, I580V)

Resolvers are located at each platform gimbal. When the missile changes attitude, the gimbal angle changes correspondingly. The resolver signals are proportional to the gimbal angle and thus to missile attitude. All the resolver outputs are 400 cycle, amplitude and phase modulated signals which are compatible with the autopilot and are therefore suitable for steering.

The roll resolver does not serve any purpose with the present configuration during flight. Pitch resolver output is fed directly to the autopilot to control the missile pitch attitude. The Azimuth resolver will be used to correct the missile roll program. This resolver is used since AIG Azimuth corresponds to missile roll at launch. The CV-A autopilot will roll the missile from o to fifteen seconds. Then the azimuth resolver will make corrections to this roll program from 16 to 19 seconds. The roll adjustment is capable of correcting 10 degrees of error. The resolver signals can be used to obtain missile attitude information as well as detecting guidance system malfunctions.

5. Yaw Steering Measurement (I528V) ⊢(B)

The Crossrange Error Function (CEF) is computed from accelerometer outputs and stored in the computer until after missile staging. After staging the accumulated CEF in combination with subsequent calculations of CEF is fed into the autopilot as a yaw steering command. The yaw steering signal is a 400 cycle phase reversing signal that is used to torque the autopilot gyros. The magnitude of the yaw steering command is controlled by the amount of CEF calculated by the computer. This signal is conditioned in the Analog Signal Converter before being telemetered.

6. Servo Error Measurements (I549D, I550D, I551D) ⊢(B)

These are measurements of the error signals in the platform servos which maintain the platform (and thereby the accelerometers') initial orientation. The servo errors, which are derived from the gyro outputs, are basically AC signals (40V max) but for telemetry purposes are demodulated in the ASC and their output is biased at 2.5 VDC to provide for positive and negative signals.

Two servo motors are used to take out backlash from the servo system. This is accomplished by constantly applying approximately 20 volts to the field of each motor in a direction which causes the motors to oppose each other. A differential signal of 1 to 2 volts is necessary to break sticktion in the motors and cause the platform to move. This prevents noise from moving the platform. In the ASC the two control voltages are combined for telemetering into one signal equal to their difference. These are gross malfunction measurements only. They indicate whether or not the platform is following the gyro outputs.

7 Redundant Gyro Measurement (I552D) (B)

Two gyros are utilized to sense platform attitude Gyro B senses changes in roll and azimuth. Gyro A senses changes in pitch and roll/azimuth (redundant). The gyro B roll and azimuth output signals and the gyro A pitch output signal are fed through a servo loop to torque the platform and thereby null the gyro outputs in these three axes. If there is any displacement in the redundant gyro axis, a signal is fed from a closed-loop amplifier to torque the gyro and thereby keep it centered between the mechanical stops. These stops are provided for all gyros and prevent an alignment error greater than two degrees between the gyro axis and the stable platform. If the redundant gyro axis is not kept at null, precession of gyro A about the Y axis may result. This measurement is used for gross malfunction data, determining the error in the nulling circuit, and as a rough measure of gyro drift.

8. Time T Measurement (I581W) (B)

Time T is the time at which the "O" offset of X accelerometer is removed and also the time of initiation of operational flight safety. The operational flight safety program is effective from time T to sustainer engine cutoff. If the Azimuth resolver goes beyond a certain value after time T, no pre-arm signal will be initiated. This measurement may be used to explain why no pre-arm signal was sent to the nose cone.

A zero offset control unit is used to adjust the accelerometer output frequency to correct for accelerometer scale factor deviations from the value which the computer has been designed to operate upon. This signal biases the accelerometer output until a signal is sent from the computer (at time T) which removes the offset bias. This correction is made only to the X accelerometer since it is the most critical.

9. Computer Redundancy Measurement (I537X) B

Each arithmetic computation is made in parallel in the computer. If the results of the two do not compare within limits, a pulse is telemetered.

10. Staging, SECO, and VECO Discretes (I521X, I522X, I523X, and I570X)

When the downrange velocity exceeds a predetermined value the staging discrete is initiated and transmitted as a 28 VDC signal to the CV-A autopilot. This 28 VDC signal is monitored (I521X) at the output of the computer.

The REF computed from accelerometer data is the basis for the generation of the sustainer engine cutoff and vernier engine cutoff. Both these discretes are monitored (I522X and I523X) directly as 28 VDC signals which are transmitted to CV-A autopilot programmer. These two discretes are also tied together for instrumentation purposes (I570X). All three of these measurements are "blipped" as well as transmitted over a commutated channel.

11. Pre-arm Signals (I525X, I526X, and I527X)

The computer unit contains two counters, with two stages each. Part of the program consists of an examination of REF, CEF, and incremental velocity to assure that they are smaller than some predetermined value. When any one of these conditions is met the counter is advanced by "one". When all these conditions have been met the counter will sit in the "three state". When the test is performed again, the second counter is advanced. When both counters are in the "3" state a pre-arming signal is given by the closure of two series-connected relays as a 28 volt DC signal. The output of each counter is monitored (I525X, I526X) and the closing of these relays is monitored (I527X) by telemetering the output signal. These measurements are all direct measurements of the 28 VDC control sign

An operational flight safety system is provided which makes a crude independent check of the system's performance. Briefly, the flight safety monitor checks the platform for excessive drift and checks the system for excessive yaw steering. The overall functioning of this unit is checked by monitoring the pre-arm signal (I527X) at the output of the pre-arm relay.

12. Computer Minus 50 VDC Power Supply Measurement (I543V)

This is a critical computer reference voltage. A fluctuation in this voltage may cause additional digits to be added or dropped in the computer.

13. Miscellaneous Environmental and Power Supply Measurements

Several environmental and power supply measurements are also provided. Gyro temperature measurements (I531T, I532T) are perhaps the most significant of the environmental measurements. The gyro rotor assembly is immersed in a fluid which, when heated to the proper temperature, holds the assembly in neutral buoyancy. If the temperature varies, the resulting torque may cause excessive gyro drift. One temperature measurement is taken on each gyro. (B)

Temperature measurement of the binnacle (I533T) the computer (I535T) and the Analog Signal Converter (I534T) are ambient temperature measurements. All measurement instrumentation for the foregoing are physically located internally within the "containers" of the units.

Vibration measurements are made along the X, Y and Z axis of the platform, the control unit and the computer. These are discussed under Airframe Instrumentation Section.

The binnacle pressure measurement (I572P) is taken to verify that pressure within the platform housing (sphere) remains approximately constant, at 20 lbs after launch. Measuring instrumentation is installed in a boss located on the outside of the platform housing sphere. (B)

In addition to the critical minus 50 volt power supply described previously the following power supplies are monitored via telemetry:

a. Control 115 volt AC phase B (I540V). This is a measurement of phase B of the Convair supplied 115V AC power.

b. Control minus 22.5 voltage (I541V).

c. Computer minus 16.5, minus 10, plus 4, and plus 38 volt power supplies (I544V, I545V, I547V, I548V).

14. Guidance Landline Measurements

For checkout and pre-launch test purposes many of the guidance measurements are provided via the landline system. This eliminates the necessity of telemetry support for these checks and pre-launch tests. It also provides a record for post-test comparison with measurements of inflight performance. The following is a list of functions to be recorded on magnetic tape: (B)

TAPE TRACK	MEAS. NO.	DESCRIPTION
1	I1603X	WORD GATE FIVE
2	I1604X	MULT GATE SIX
3	I1605X	112 CPS GATE
4	------	50 KC
5	------	100 KC
6	------	100 KC
7	------	TIMING, VOICE, SPEEDLOCK
8	------	DIGITAL CHANNEL *
9	I1515A	ACCELEROMETER X F1
10	I1518A	ACCELEROMETER X F2
11	I1517A	ACCELEROMETER Z F1
12	I1520A	ACCELEROMETER Z F2
13	I1516A	ACCELEROMETER Y F1
14	I1519A	ACCELEROMETER Y F2

(B)

* Digital Channel includes the following measurements:

I1505H	COMPUTER POSITION X	I1502L	COMPUTER VELOCITY X
I1506H	COMPUTER POSITION Y	I1503L	COMPUTER VELOCITY Y
I1507H	COMPUTER POSITION Z	I1504L	COMPUTER VELOCITY Z

I1508H	RANGE ERROR FUNCTION	I1510W	ELAPSED TIME
I1509H	AZM ERROR FUNCTION		

The format of this channel is shown on the Inertial Guidance Digital Word Structure illustration (see list of illustrations).

In addition to the measurements recorded on magnetic tape nine guidance measurements are recorded on an 8-channel Sanborn recorder according to the following format.

RECORDER CHANNEL	MEAS. NO.	DESCRIPTION
1	I1591C	PITCH GYRO TORQUE
2	I1592C	ROLL GYRO TORQUE
3	I1593C	YAW GYRO TORQUE
4	I1594D	PENDULUM #1 NULL
5	I1595D	PENDULUM #2 NULL
6	I1596D	OPTIC SIGNAL
7	------	EVENTS *
8	------	400 CPS REFERENCE

(B)

* Events include the following:

I1521X VERN ENGINE COF SIG

I1522X S ENGINE COF SIG

I1570X STAGING SIGNAL

IV. SUPPORTING SYSTEMS MEASUREMENTS

A. Main Tank Pressurization

During flight, the missileborne propellant tank pressurization system serves to maintain the structural integrity of the airframe, and to furnish head pressure thus assuring propellant flow to the turbopumps.

Helium usage rates and distribution will be determined on several E series flight articles for design information. The temperature (F247T) and pressure

(F246P, F260P) of the helium in the supply bottles will be measured to permit calculation of the mass of gas expended. Calibrated orifices will be inserted in the fuel and LO_2 tank pressurization lines. If the differential pressures across the orifices (F34P, F147P), and the pressure (F212P, F65P) and temperature (F17T, F146T) of the helium going into the orifices are known, then the helium flow rate to each propellant tank can be determined.

The behavior of the main tank pressurization regulators will be extensively examined on the first five E series flight missiles for correlation with the flight environment, design requirements, and captive missile test results. The state of the helium at the regulator inlets will be established by the LO_2 tank pressurization regulator inlet pressure (F114P) and temperature (F115T) measurements. Actual regulator performance will be revealed by the pressurization line orifice differential pressure (F34P, F147P) and background pressure (F212P, F65P), and main tank ullage pressure (F1P, F3P) instrumentation.

The helium heat exchanger performance will be monitored on the first five flight missiles for comparison with helium usage and captive test data. The temperature change effected in the helium when passing through the heat exchanger will be established by the supply bottle (F247T) and LO_2 regulator inlet (F115T) temperature measurements.

Finally, the main tank ullage pressures (F1P, F3P) will be monitored on all vehicles as they are the end results of the missile tank pressurization system. (B)

B. Hydraulic System

Extensive hydraulic system analysis in support of the E flights will have been made from analog computer studies and captive missile testing. Instrumentation on the flight missiles will be limited to measurements for verifying adequate hydraulic system performance and to indicate any possible malfunction, should such occur.

Pressure measurements in each system (H140P and H33P) have been strategically located to reflect any major pressure fluctuations in either hydraulic system. Measurements of guidance command signals, resulting engine position measurements and hydraulic system pressures will verify the above studies. Should flight environment introduce unpredicted conditions in the hydraulic system, this will also be apparent from these fundamental measurements.

Since the booster and sustainer hydraulic pumps are mechanically geared to the main engine turbines, pump speeds can be computed from P84E and P349B. These measurements in conjunction with the previously mentioned pressure measurements will verify proper power inputs to the system. (B)

The ability of the propellant utilization and head suppression valves to respond to their command signals will verify the adequacy of the sustainer engine hydraulic controls.

C. Electrical Power Supply

On "E" series missiles, airborne electrical power will be provided from a remotely activated primary battery. The battery is filled with acid from a container ruptured by a remotely generated signal, and is capable of remaining usable in this activated condition for several weeks, providing no power drain is placed on it.

Missile AC power will be provided from either a Bendix or Leland rotary inverter as on previous "D" series missiles. In either case the inverter will be supplied by the 28V main missile battery. (B)

The AC and DC power from the battery-inverter is routed first to the power distribution box and from there is distributed to the various missile systems. AC frequency (E50Q), three phases of AC voltage, and DC voltage (E28V) are picked up for telemetering from the missile system side of the motor driven switching assembly of the power distribution box. Phase A and phase C AC voltage are measured by E51V and E53V, respectively. Phase B voltage is instrumented and conditioned by ARMA as I540V CONTROL 115 Phase B. All three signals are conditioned to limit the instrumented range and thereby expand the measurement scale. Three phases are being monitored to assist in evaluation of the ARMA inertial guidance system, and the static inverter, should it be incorporated on later "E" series missiles. Current measurements are not planned since the electrical loads are known from systems testing and the currents may be calculated knowing the voltage. (B) (B) (B)

D. Tracking and Command Systems

1. Azusa

a. Functional Description

Azusa is an all-weather, electronic tracking system which includes ground transmitting and receiving units, data handling and indicating equipment, a servo-directed antenna system, and an airborne transponder located in the missile. Tracking data is provided by the system in the form of two direction cosines and range, available either as three shaft positions or in digital form suitable for immediate use and/or storage on magnetic tape. Presently, this system, in conjunction with the IBM 709 computer, is the primary range system for providing impact prediction information for range safety purposes.

Briefly, the principle of operation is that successive trajectory positions of the airborne transponder are determined by continuously comparing the phase difference between microwave signals transmitted to the transponder from the ground station, and the retransmittal of these signals to the ground from the transponder.

The instrumentation provided on this system is designed to enable continuing investigation of the radio wave propagation effects and airborne antenna characteristics. Used in conjunction with information recorded at the ground station, over-all system operation can be evaluated with the instrumentation described in the following paragraphs.

b. Klystron Power Output (Z2E) ⊢B

The klystron produces a 5000 MC output which is mixed with the 5060.194 MC input signal in the crystal mixer to produce a 60.194 MC IF signal. The crystal current is proportional to the klystron power output and is telemetered to verify that the klystron produces enough power output to assure proper tracking over the specified range.

c. Transponder RF Input/AGC (Z3E) ⊢B

An AGC (automatic gain control) voltage, generated from the input signal to the limiter, is fed back to the grids of the RF amplifier stages. This is a negative voltage proportional to the amplitude of the signal from the IF amplifier. Its function is to adjust the gain of the RF amplifier stage in a manner which holds the IF amplifier output constant in amplitude regardless of changes in power of the received signal.

Since this voltage is proportional to the output of the IF amplifier, it is also proportional to the power of the RF input signal to the transponder. Measurement of the AGC voltage (Z3E) is a convenient and conventional method of measuring received power level. (B)

2. Mod III E Trajectory Instrumentation System

a. Description

This system is basically an adaption of the GE Mod III guidance system to AIG tracking purposes. The airborne portion consists of a rate beacon, a pulse beacon, a common antenna, and associated waveguide including low-pass and high pass filters. This subsystem operates in conjunction with related Mod III ground equipment to perform instantaneous position and rate measuring functions for impact prediction. The Mod III E Trajectory Instrumentation System will be installed on flight missiles only. No captive testing is planned.

b. Rate and Pulse Beacon AGC (G579V and G503V) (B)

An automatic gain control (AGC) circuit is utilized in the IF sections of the pulse beacon and the rate beacon. AGC voltages are generated in these circuits which are negative signals proportional to the strength of the signals being received by the IF amplifiers. Measurements of one of the two rate beacon AGC's (G579V) and the pulse beacon AGC (G503V) will be telemetered for post-test analysis. Although these measurements are useful in determining receiver operation, their main value lies in permitting the investigation of radio wave propagation effects and airborne antenna characteristics. This investigation consists of comparing the power of the signal sent from the ground with the power of the signal at the airborne transponders. For this reason, the AGC voltage measurements are calibrated directly in terms of transponder power input rather than in terms of voltage. (B)

c. Rate Beacon Power Output (G582V) (B)

A crystal is inserted in the rate beacon hybrid coupler which produces a voltage proportional to the power of the output signals from the rate beacon. This measurement is used for over-all rate beacon performance evaluation and, as in the case of the AGC measurements, for radio wave propagation effects and antenna characteristics.

d. Pulse Beacon Magnetron Current (G504C) (B)

The pulse beacon magnetron current is proportional to the duration, rate, and amplitude of the pulses transmitted from the beacon. The current is measured by the voltage drop in a section of the magnetron cathode resistor. Since the magnetron transmits pulses, the voltage drop is integrated to make it compatible to telemetry. This measurement along with the pulse beacon AGC measurement will provide the basic information required for post-test analysis of over-all pulse beacon performance.

e. Additional Data

In addition to the instrumentation provided via the telemetering system, parameters instrumented at the Mod III ground station reflect system performance. (See the range data section of the report for more detail.) Of greatest importance to over-all system performance evaluation are the Mod III ground station computed missile position, velocity and impact point data. This data when compared with other appropriate trajectory data will indicate how adequately this system performs its designed function.

3. Strobe Light System

A strobe light system is planned for E R&D series missiles for the purpose of providing an optical tracking aid. The strobe light system is housed in a single package which contains a strobe lamp, associated electronics, and a remotely activated "one shot" primary battery. On E R&D missiles the system is mounted on the forward fairing of the B-2 pod. System activation is initiated by the autopilot programmer at sustainer cutoff, after which time high intensity light flashes are emitted at half-second time intervals until depletion of battery power. (B)

Upon receipt of the activate command, the system also provides a continuous 28 VDC signal to a telemetry relay which switches telemetry channel E from a commutated source to the strobe light system signal source. Each time the strobe lamp flashes a 5 volt square wave pulse (M78X) is provided to the telemetry system to provide the timing correlation necessary for ballistic camera data reduction. The flash duration is 1.0 milliseconds with a peaking time of 0.1 milliseconds.

The ballistic camera system used in conjunction with the strobe light is described in section 4-II. F. 2, Trajectory Instrumentation.

Battery Activation is accomplished from the blockhouse prior to launch. One of the countdown requirements is to determine that the strobe light battery reached full power potential (26-30 VDC) within 20 seconds after activation. MM144V, strobe light battery, a panel meter on the RF system console is used to indicate satisfactory activation of the battery.

4. Range Safety Command System

The function of the airborne Range Safety Command (RSC) system is to receive and detect coded RF signals from a ground control station and to cause appropriate engine cutoff action or explosive destruction of the missile when so commanded.

The RSC system is composed of a ground station, two receiving antennas connected through a coupler, two command sets (either of which will operate on the signal from either antenna), an arming switch and a destruct unit. Upon initiation of a manual fuel cutoff command, an automatic fuel command signal transmitted from the ground is frequency modulated by a combination of frequencies. The airborne command sets receive this signal and detect the modulating frequencies. A relay logic circuit decodes the information and provides a 28 VDC output to the destructor and/or the engine relay box.

a. #1 RSC RF Input/AGC (D7V) ⊢B

The automatic gain control voltage generated from the output of the second IF amplifier of the #1 receiver is used as a measure of the received signal strength. This is required to verify that the signal in the RSC receiver is strong enough to be properly detected. This is an aid to determining maximum safe operating range.

b. RSC Cutoff and Destruct Outputs (D1V and D3X) ⊢B

The cutoff and destruct instrumentation is a measurement of RSC decoder (relay) operation. The destruct instrumentation (D3X) monitors the destruct relay position in either set. The cutoff ⊢B

instrumentation (DIV) for both receivers is tied together in a summing network to produce step deviations on the telemetry output sufficient to determine whether the signal was an automatic or manual fuel cutoff signal. The circuitry is designed so that a manual fuel cutoff signal will produce a 2.3 VDC output (46% of IBW) for telemetering and an automatic fuel cutoff signal will produce a 4.6 VDC (92% of IBW) signal for telemetering. In the event a destruct signal is generated by the RSC system. This output is also superimposed on the Pitch Rate Gyro Signal (S53R) on continuous channel 1.10 to provide a precise time of function occurrence.

5. Telemetry

The telemeters used on the WS107A-1 XSM-65E missiles are of the same design as those used on the past R&D missiles, and hence, a high degree of reliability has been obtained. For these reasons no measurements of the telemeter itself are planned. Evaluation will be performed from recordings of signal strength and center frequency, and from the quality of data received. (B)

V. PAYLOAD INSTRUMENTATION

A. Re-Entry Vehicles

Instrumentation of the re-entry vehicles is the responsibility of the re-entry vehicle associate contractors. Likewise reduction, analysis, and reporting of data obtained on re-entry vehicle performance is also the responsibility of the re-entry vehicle associate contractors. Normally this data is of little significance in the analysis of the performance of the remainder of the Atlas missile. At times, however, when a complex problem arises, re-entry vehicle data can be of considerable value to Atlas missile test analysis. For this reason the following sections pertaining to re-entry vehicle instrumentation is presented for Convair personnel information purposes.

1. Atlas Monitored Signals (S248X, Y1X)

The re-entry vehicle contractor is responsible for separating the re-entry vehicle from the Atlas. Convair responsibility is to send a release signal to the re-entry vehicle which in turn initiates a separation routine.

This signal is part of an autopilot programmer subroutine based on vernier cutoff. Instrumentation of this signal (S248X) is provided to verify that it is correctly sent.

On those missiles that carry an Avco re-entry vehicle, a microswitch will be installed on the adapter by Avco to indicate re-entry vehicle separation. The microswitch indication will be monitored (Y1X) by the Atlas telemetry system.

2. Avco Series IV FRV4-1

One telemetry transmitter is utilized in the Avco Series IV FRV4-1 reentry vehicle. The telemetry system is not activated until apogee. The following is a typical list of measurements, by sampling rate, transmitted by the telemeter. Further details may be obtained from Avco.

SAMPLING RATE (SPS)	AVCO MEAS. NO.	MEASUREMENT DESCRIPTION	RANGE FROM	RANGE TO	UNITS
Continuous	F6135	LINEAR ACCELERATION Ayl	M20	20	G
Continuous	F6136	LINEAR ACCELERATION Azl	M20	20	G
Continuous	F6269	ANGULAR RATE ABOUT Y-AXIS Q1	M30	30	D/S
Continuous	F6271	ANGULAR RATE ABOUT Y-AXIS Q2	M720	720	D/S
Continuous	F6270	ANGULAR RATE ABOUT Z-AXIS R1	M30	30	D/S
Continuous	F6272	ANGULAR RATE ABOUT Z-AXIS R2	M720	720	D/S
Continuous	F8340	CASSETTE EJECTION DETECTION			
Continuous	F2013	IMPACT FUZING SYSTEM 1 OUTPUT			
Continuous	F2014	IMPACT FUZING SYSTEM 2 OUTPUT			

SAMPLING RATE (SPS)	AVCO MEAS. NO.	MEASUREMENT DESCRIPTION	RANGE FROM	RANGE TO	UNITS
Continuous	F2015	WARHEAD DEFORMATION SIGNAL			
20	F2009	AIRBURST SIGNAL NO. 1			
20	F2010	AIRBURST SIGNAL NO. 2			
10	F6133	LINEAR ACCELERATION AX_1	M10	10	G
10	F6134	LINEAR ACCELERATION AX_2	M70	0	G
10	F6268	ANGULAR RATE ABOUT X-AXIS P1	M720	720	D/S
10	F8245	NOSE, FORECONE, FORWARD PRESSURE (34.02, 40°)			
10	F8246	NOSE, FORECONE, MID PRESSURE (36.98, 68°)			
10	F8247	NOSE, BEHIND SHOULDER PRESSURE (41.84, 55°)			
10	F8248	CYLINDER, AFT PRESSURE (116.00, 55°)			
10	F8249	FLARE PRESSURE (125.50, 55°)			
10	F8250	FLARE PRESSURE (144.64, 55°)			
10	F8253	BASE PRESSURE			
10	F9149	STAGNATION POINT ABLATION (21.78, 0°)			
10	F9150	SONIC POINT ABLATION (25.20, 13°)			
10	F9151	SONIC POINT ABLATION (25.20, 193°)			
10	F9152	TANGENT POINT ABLATION (30.12, 130°)			

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SAMPLING RATE (SPS)	AVCO MEAS. NO.	MEASUREMENT DESCRIPTION	RANGE FROM	RANGE TO	UNITS	
10	F9153	BEHIND SHOULDER ABLATION (41.46, 35°)				
10	F9154	BEHIND SHOULDER ABLATION (41.46, 125°)				
10	F9155	BEHIND SHOULDER ABLATION (41.46, 215°)				
10	F9156	BEHIND SHOULDER ABLATION (41.46, 305°)				
10	F9157	CYLINDER, AFT ABLATION (116.00, 35°)				
10	F9160	FLARE, AFT ABLATION (144.64, 35°)				
10	F8334	85% of 4.OV DERIVED FROM 29V SUPPLY, 40.0 KC SCO		3.4	VDC	B
10	F8336	0% CAL. PULSE, 40 KC SCO		GND		
10	F8314	50% CAL. PULSE, 40 KC SCO		2.[illegible]	VDC	
10	F8316	85% CAL. PULSE, 40 KC SCO		4.0	VDC	
5	F2001	LOCKOUT SWITCH NO. 1				
5	F2002	LOCKOUT SWITCH NO. 2				
5	F2007	ARM DELAY NO. 1				
5	F2008	ARM DELAY NO. 2				
5	F3274.1	TANGENT POINT TEMP (30.12, 55°)				
5	F3275.1	TANGENT POINT TEMP (30.12, 145°)				
5	F3276.1	TANGENT POINT TEMP (30.12, 2[illegible]°)				
5	F3277.1	TANGENT POINT TEMP (30.12, 325°)				
5	F3282	FLARE TEMPERATURE (125.72, 42°)				
5	F3283	FLARE TEMPERATURE (125.72, 42°)				

SAMPLING RATE (SPS)	AVCO MEAS. NO.	MEASUREMENT DESCRIPTION	RANGE FROM	TO	UNITS
5	F8347	REF. JUNCTION TEMP. (FORWARD)			
5	F8348	REF. JUNCTION TEMP. (AFT)			
5	F8337	0% CAL. PULSE 22 KC SCO		GND	
5	F8349	39% CAL. PULSE 22 KC SCO		20	MV
5	F8350	66% CAL. PULSE 22 KC SCO		34	MV
5	F8351	100% OF 4.0 V SUPPLY 22 KC SCO		4.0	VDC
2	F2005	BATTERY VOLTAGE NO. 1			
2	F2006	BATTERY VOLTAGE NO. 2			
2	F2011	IMPACT FUZING SYSTEM 1 MONITOR			
2	F2012	IMPACT FUZING SYSTEM 2 MONITOR			
2	F8251	FIN NO. 1 PORT PRESS. (144.32, 176° 30')			
2	F8252	FIN NO. 1 STB'D PRESS. (144.32, 183° 30')			
1	F0016	PHYSICAL SEPARATION	OFF	ON	
1	F2003	ANA BATTERY NO. 1 MONITOR			
1	F2004	ANA BATTERY NO. 2 MONITOR			
1	F3255	NOSE, SONIC POINT TEMP. (25.24, 232°)			
1	F3256	NOSE, TANGENT POINT TEMP. (30.82, 45°)			

B

SAMPLING RATE (SPS)	AVCO MEAS. NO.	MEASUREMENT DESCRIPTION	RANGE FROM	TO	UNITS
1	.3257	CYLINDER, FORWARD TEMP. (44.60, 45°)			
1	F3258	CYLINDER, FORWARD TEMP. (44.60, 135°)			
1	F3259	CYLINDER, FORWARD, TEMP. (44.60, 225°)			
1	F3260	CYLINDER, FORWARD TEMP. (44.60, 315°)			
1	F3261	CYLINDER, MID TEMP. (92.00, 45°)			
1	F3262	CYLINDER, MID TEMP. (92.00, 135°)			
1	F3263	CYLINDER, MID TEMP. (92.00, 215°)			
1	F3264	CYLINDER, MID TEMP. (92.00, 315°)			
1	F3265	CYLINDER, AFT TEMP. (116.00, 45°)			
1	F3266	CYLINDER, AFT TEMP. (116.00, 225°)			
1	F3267	FLARE, MID TEMP. (130.23, 225°)			
1	F3268	FLARE, AFT TEMP. (144.74, 45°)			
1	F3268	BASE (AFT DOOR) TEMP.			
1	F3270	NOSE COMPARTMENT TEMP. (26.88, 225°)			
1	F3271	NOSE COMPARTMENT TEMP. (37.20, 225°)			
1	F3272	NOSE COMPARTMENT TEMP. (125.72, 225°)			
1	F3273	NOSE COMPARTMENT TEMP. (130.40 55°)			
1	F8328	CASSETTE EJECTION SIGNAL			
1	F8329	CASSETTE EJECTION DETECTION			

B

SAMPLING RATE (SPS)	AVCO MEAS. NO.	MEASUREMENT DESCRIPTION	RANGE FROM	RANGE TO	UNITS
1	F9158	CYLINDER, AFT ABLATION (116.00, 215°)			
1	F9159	FLARE, FORWARD ABLATION (125.72, 215°)			
1	F9161	FIN NO. 1 ABLATION (145.10, 0°)			
1	F9162	FIN NO. 2 ABLATION (145.10, 180°)			
1	F9163	BASE (AFT DOOR) ABLATION			
1	F8341	1.7 KC CONT. CHANNEL CAL.		4.0	VDC
1	F8342	2.3 KC CONT. CHANNEL CAL.		4.0	VDC
1	F8343	3.0 KC CONT. CHANNEL CAL.		4.0	VDC
1	F8344	3.9 KC CONT. CHANNEL CAL.		4.0	VDC
1	F8345	5.4 KC CONT. CHANNEL CAL.		4.0	VDC
1	F8346	10.5 KC CONT. CHANNEL CAL.		4.0	VDC
1	F8319.2	85% OF 4.0 V DERIVED FROM 29V SUPPLY, 14.5 KC SCO		3.4	VDC
1	F8338	0% CAL. PULSE, 14.5 KC SCO		GND	
1	F8321	50% CAL. PULSE, 14.5 KC SCO		2.0	VDC
1	F8320	85% CAL. PULSE, 14.5 KC SCO		3.4	VDC
1	F8323.2	85% OF 4.0 V DERIVED FROM 29V SUPPLY, 7.35 KC SCO		3.4	VDC
1	F8339	0% CAL. PULSE, 7.35 KC SCO		GND	
1	F8325	50% CAL. PULSE, 7.35 KC SCO		2.0	VDC
1	F8324	85% CAL. PULSE, 7.35 KC SCO		3.4	VDC

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3. Avco Series IV FRV4-2

On FRV4-2 re-entry vehicles Sandia will provide the telemetry system. This system includes two transmitters, both activated prior to launch. The following is a typical list of Avco measurements, by sampling rate, transmitted by the telemetry system. Sandia information is not available at this time. Further details may be obtained from Avco.

SAMPLING RATE (SPS)	AVCO MEAS. NO.	MEASUREMENT DESCRIPTION	RANGE FROM	RANGE TO	UNITS
Continuous	F2013	IMPACT FUZING SYSTEM 1 OUTPUT			
Continuous	F2014	IMPACT FUZING SYSTEM 2 OUTPUT			
Continuous	F2015	WARHEAD DEFORMATION SIGNAL			
Continuous	F8340	CASSETTE EJECTION DETECTION			
60	F6135	LINEAR ACCELERATION Ay1	M20	20	G
60	F6136	LINEAR ACCELERATION Az1	M20	20	G
60	F6269	ANGULAR RATE ABOUT Y-AXIS Q1	M30	30	D/S
60	F6271	ANGULAR RATE ABOUT Y-AXIS Q2	M720	720	D/S
60	F6270	ANGULAR RATE ABOUT Z-AXIS R1	M30	30	D/S
60	F6272	ANGULAR RATE ABOUT Z-AXIS R2	M720	720	D/S
20	F2009	AIRBURST SIGNAL NO. 1			
20	F2010	AIRBURST SIGNAL NO. 2			

B

SAMPLING RATE (SPS)	AVCO MEAS NO.	MEASUREMENT DESCRIPTION	RANGE FROM	TO	UNITS
10	F6133	LINEAR ACCELERATION Ax1	M10	10	G
10	F6134	LINEAR ACCELERATION Ax2	M70	0	G
10	F6268	ANGULAR RATE ABOUT X-AXIS P1	M720	720	D/S
5	F3274	TANGENT POINT TEMP. (30.12, 55°)			
5	F3275	TANGENT POINT TEMP. (30.12, 145°)			
5	F3276	TANGENT POINT TEMP. (30.12, 235°)			
5	F3277	TANGENT POINT TEMP. (30.12, 325°)			
5	F3278	CYLINDER, FWD TEMP. (44.60, 55°)			
5	F3279	CYLINDER, FWD TEMP. (44.60, 145°)			
5	F3280	CYLINDER, FWD TEMP. (44.60, 235°)			
5	F3281	CYLINDER, FWD TEMP. (44.60, 325°)			
5	F3282	FLARE TEMP. (125.72, 42°)			
5	F3283	FLARE TEMP. (125.72, 42°)			
5	F8245	NOSE, FORECONE, FWD PRESS (34.02, 40°)			
5	F8246	NOSE, FORECONE, MID PRESS (36.98, 68°)			
5	F8247	NOSE, BEHIND SHOULDER PRESS (41.84, 55°)			

(B)

SAMPLING RATE (SPS)	AVCO MEAS. NO.	MEASUREMENT DESCRIPTION	RANGE FROM	TO	UNITS
5	F8248	CYLINDER, AFT PRESS (116.00, 55°)			
5	F8249	FLARE PRESS (125.50, 55°)			
5	F8250	FLARE PRESS (144.64, 55°)			
5	F8251	FIN NO. 1, PORT PRESS (144.32, 176° 30')			
5	F8252	FIN NO. 2, STB'D PRESS (144.32, 183° 30')			
5	F9149	STAGNATION POINT ABLATION (21.78, 0°)			
5	F9150	SONIC POINT ABLATION (25.20, 13°)			
5	F9151	SONIC POINT ABLATION (25.20, 193°)			
5	F9152	TANGENT POINT ABLATION (30.12, 130°)			
5	F9153	BEHIND SHOULDER ABLATION (41.46, 35°)			
5	F9154	BEHIND SHOULDER ABLATION (41.46, 125°)			
5	F9155	BEHIND SHOULDER ABLATION (41.46, 215°)			
5	F9156	BEHIND SHOULDER ABLATION (41.46, 305°)			
5	F9159	FLARE, FORWARD ABLATION (125.72, 215°)			
5	F9160	FLARE, AFT ABLATION (144.64, 35°)			
5	F9161	FIN NO. 1 ABLATION (145.10, 0°)			
5	F9162	FIN NO. 2 ABLATION (145.10, 180°)			

B

SAMPLING RATE (SPS)	AVCO MEAS. NO.	MEASUREMENT DESCRIPTION	RANGE FROM	RANGE TO	UNITS
2	F0014	GOOD GUIDANCE SIGNAL	OFF	ON	
2	F0015	SEPARATION SIGNAL	OFF	ON	
2	F2005	BATTERY VOLTAGE NO. 1			
2	F2006	BATTERY VOLTAGE NO. 2			
2	F2011	IMPACT FUZING SYSTEM 1 MONITOR			
2	F2012	IMPACT FUZING SYSTEM 2 MONITOR			
1	F0016	PHYSICAL SEPARATION	OFF	ON	
1	F2001	LOCKOUT SWITCH NO. 1			
1	F2002	LOCKOUT SWITCH NO. 2			
1	F2003	ANA BATTERY NO. 1 MONITOR			
1	F2004	ANA BATTERY NO. 2 MONITOR			
1	F2007	ARM DELAY NO. 1			
1	F2008	ARM DELAY NO. 2			
1	F3255	NOSE, SONIC POINT TEMP. (25, 24, 232°)			
1	F3256	NOSE, TANGENT POINT TEMP. (30, 82, 45°)			
1	F3257	CYLINDER, FORWARD TEMP. (44.60, 45°)			
1	F3258	CYLINDER, FORWARD TEMP. (44.60, 135°)			
1	F3259	CYLINDER, FORWARD TEMP. (44.60, 225°)			
1	F3260	CYLINDER, FORWARD TEMP. (44.60, 315°)			

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SAMPLING RATE (SPS)	AVCO MEAS. NO.	MEASUREMENT DESCRIPTION	RANGE FROM	TO	UNITS
1	F3284	CYLINDER, AFT TEMP. (116.00, 135°)			
1	F3285	CYLINDER, AFT TEMP. (116.00, 315°)			
1	F3265	CYLINDER, AFT TEMP. (116.00, 45°)			
1	F3266	CYLINDER, AFT TEMP. (116.00, 225°)			
1	F3267	FLARE, MID TEMP. (130.23, 225°)			
1	F3268	FLARE, AFT TEMP. (144.74, 45°)			
1	F3269	BASE, (AFT DOOR) TEMP.			
1	F3270	NOSE COMPARTMENT TEMP. (26.88, 225°)			
1	F3271	NOSE COMPARTMENT TEMP. (37.20, 225°)			
1	F3272	AFT COMPARTMENT TEMP. (125.72, 225°)			
1	F3273	AFT COMPARTMENT TEMP. (130.40, 55°)			
1	F8253	BASE, (AFT DOOR) PRESS			
1	F8347	REF. JUNCTION TEMP. (FORWARD)			
1	F8348	REF. JUNCTION TEMP. (AFT)			
1	F8329	CASSETTE EJECTION DETECTION			
1	F9163	BASE, (AFT DOOR) ABLATION			

B

MEASUREMENT CODE		NUMBER OF MEASUREMENTS (Avco)	
MEAS. NO.	DESCRIPTION	FRV4-1	FRV4-2
F0000	SEPARATION SIGNAL	1	3
F2000	ARMING AND FUZING SIGNALS	15	15
F3000	TEMPERATURES		
	Heat-Shield Structure Interface	15	13
	Compartment Temperatures	4	4
	Material Temperatures	4	8
	Surface Temperatures	2	2
F6000	DYNAMIC MEASUREMENTS	9	9
F8200	PRESSURES	9	9
F8300	INSTRUMENTATION FUNCTIONS	27	4
F9000	ABLATION	15	13
	TOTAL	101	80

4. Avco Series IV FRV4-3

The FRV4-3 re-entry vehicles will be systems engineering vehicles. A system evaluation type instrumentation program will be conducted. Information concerning this program is not presently available to Convair.

5. GE Mark III Mod I

Two (2) telemetry transmitters, one transmitting a time delayed recording of the other's output, are utilized in the GE Mark III Mod I Re-entry Vehicle. The following is a typical list of measurements, by telemetry channel, transmitted by the two telemeters. Further details can be obtained from General Electric.

Telemetry Channel (IRIG)	COMMUTATOR SEGMENT	MEASUREMENT DESCRIPTION	RANGE FROM	RANGE TO	UNITS
6	--	ROLL RATE	M300	300	D/S
7	--	PITCH ACCELERATION @ C. G.	M45	45	G
8	--	YAW ACCELERATION @ C. G.	M45	45	G
9	--	YAW RATE	M600	600	D/S
10	--	PITCH RATE	M600	600	D/S
11	--	YAW ACCELERATION @ NOSE	M45	45	G
12	--	PITCH ACCELERATION @ NOSE	M45	45	G
13	--	SANDIA WARHEAD DATA			
14	--	SANDIA WARHEAD DATA			
15	--	SANDIA WARHEAD DATA			
16	--	SANDIA WARHEAD DATA			
E	0	90 x 10 COMMUTATOR			
	1	10% CALIBRATION-28 VDC BATTERY			
	2	100% CALIBRATION-28 VDC BATTERY			
	3	100% CALIBRATION-5 VDC XDCR SUPPLY			
	4	50% CALIBRATION-2.5 VDC XDCR SUPPLY			
	5	10% CALIBRATION-0.5 VDC XDCR SUPPLY			
	6	50% CALIBRATION-INSTRUMENTATION MONITOR			
	7	PRESSURE NO. 1			
	8	PRESSURE NO. 2			
	9	PRESSURE NO. 3			
	10	PRESSURE NO. 4			
	11	PRESSURE NO. 5			
E	12	PRESSURE NO. 6			
	13	PRESSURE NO. 7			
	14	PRESSURE NO. 8			
	15	PRESSURE NO. 9			
	16	PRESSURE NO. 10			
	17	PRESSURE NO. 11			
	18	PRESSURE NO. 12			
	19	PRESSURE NO. 13			
	20	PREARM LOCKOUT, PRESSURE SIGNAL, FRANGIBLE PATCH NO. 1, NO. 2			
	21	DATA CORRELATOR			
	22	ARM NO. 2, MOTOR CLUTCH NO. 2, CURRENT PROGRAMMER NO. 2			
	23	FUZE NO. 2, BATTERY NO. 2			

B

Telemetry Channel (IRIG)	COMMUTATOR SEGMENT	MEASUREMENT DESCRIPTION	RANGE FROM	TO	UNITS
E	24	FUZE NO. 1, BATTERY NO. 1			
	25	SOUND PRESSURE LEVEL NO. 2 (300 CPS to 10 KC)	120	160	db
	26	VIBRATION NO. 1	M5	5	G
	27	VIBRATION NO. 2	M5	5	G
	28	SOUND PRESSURE LEVEL NO. 1 (300 CPS to 10 KC)	120	160	db
	29	ARM NO. 1, MOTOR CLUTCH NO. 1, CURRENT PROGRAMMER NO. 1			
	30	LONGITUDINAL ACCELERATION, FINE	M10	0	G
	31	SOUND PRESSURE LEVEL NO. 2 (10 KC to INFINITE)	120	160	db
	32	INTERNAL TEMPERATURE NO. 1	0	200	DGF
	33	INTERNAL TEMPERATURE NO. 2	0	200	DGF
	34	SOUND PRESSURE LEVEL NO. 1 (10 KC to INFINITE)	120	160	db
	35	INTERNAL PRESSURE	0	30	PSIA
	36	50% CALIBRATION, INSTRUMENTATION MONITOR			
	37	PRESSURE NO. 1			
	38	PRESSURE NO. 2			
	39	PRESSURE NO. 3			
	40	ABLATION NO. 1			
	41	ABLATION NO. 2			
	42	ABLATION NO. 3			
	43	ABLATION NO. 4			
	44	ABLATION NO. 5			
	45	ABLATION NO. 6			
	46	ABLATION NO. 7			
	47	ABLATION NO. 8			
	48	ABLATION NO. 9			
	49	ABLATION NO. 10			
	50	ABLATION NO. 11			
	51	LONGITUDINAL ACCELERATION, FINE	M10	0	G
	52	ABLATION NO. 13			

Telemetry Channel (IRIG)	COMMUTATOR SEGMENT	MEASUREMENT DESCRIPTION	RANGE FROM	TO	UNITS
E	53	ABLATION NO. 14			
	54	ABLATION NO. 15			
	55	ABLATION NO. 16			
	56	ABLATION NO. 17			
	57	ABLATION NO. 18			
	58	ABLATION NO. 19			
	59	ABLATION NO. 20			
	60	ABLATION NO. 21			
	61	ABLATION NO. 22			
	62	ABLATION NO. 23			
	63	ABLATION NO. 12			
	64	LINER TEMPERATURE NO. 2			
	65	LINER TEMPERATURE NO. 3			
	66	50% CALIBRATION-INSTRUMENTATION MONITOR			
	67	PRESSURE NO. 1			
	68	PRESSURE NO. 2			
	69	PRESSURE NO. 3			
	70	LINER TEMPERATURE NO. 4			
	71	LINER TEMPERATURE NO. 5			
	72	LINER TEMPERATURE NO. 6			
	73	INFLIGHT SUPERVISION MONITOR			
	74	SHIELD TEMPERATURE NO. 1			
	75	SHIELD TEMPERATURE NO. 2			
	76	SHIELD TEMPERATURE NO. 3			
	77	SHIELD TEMPERATURE NO. 4			
	78	SHIELD TEMPERATURE NO. 5			
	79	SHIELD TEMPERATURE NO. 6			
	80	SHIELD TEMPERATURE NO. 7			
	81	50% CALIBRATION, INSTRUMENTATION MONITOR			
	82	SHIELD TEMPERATURE NO. 9			
	83	LINER TEMPERATURE NO. 1			
	84	SHIELD TEMPERATURE NO. 8			
	85	50% CALIBRATION, INSTRUMENTATION MONITOR			

(B)

Telemetry Channel (IRIG)	COMMUTATOR SEGMENT	MEASUREMENT DESCRIPTION	RANGE FROM	TO	UNITS
E	86	LONGITUDINAL ACCELERATION, COARSE	M75	0	G
	87	LONGITUDINAL ACCELERATION, FINE	M10	0	G
	88	SEPARATION EVENT			
	89	FRAME SYNC			
	90	FRAME SYNC			

6. GE Mark III Mod II

Description of the Mod II instrumentation is not currently available to Convair.

VI. GROUND SUPPORT EQUIPMENT MEASUREMENTS

A. Launcher

The "E" series launcher is designed for an entirely unrestrained launch of the missile. During FRF's four hold-down hooks are the only means of missile restraint. The hooks are mounted on a trapezoidally shaped frame which rotates upward 90° to engage the missile while the missile is in the horizontal position. Upon erection the bases of the hooks slip into place and are held securely in four pedestal assemblies on the ground. The pedestal assemblies support the weight of the missile in the erect position. To establish launcher integrity, the following measurements will be made on 3E.

1. Temperatures

Due to the structural differences between this launcher and the "D" launcher, and different aspiration ratios, temperatures of the pedestals will be a prime consideration. Temperature measurements will be taken on the side of the pedestal facing the engines (L1405T, L1407T).

Also, on the side facing the turbine exhausts, delta "T" measurements will be made across the plate (inside to outside of pedestal) to detect temperature difference which would cause warpage. (L1415T, L1416T).

2. Strain

Static and dynamic loads in the hooks will be measured by strain gages on the smallest cross section (L1401S, L1402S).

3. Deflection

Position indicators (L1398D, L1399D) will determine separation at the disconnect panels at the time of firing, and detect amounts of settling on tanking.

B. Subcooled LO_2 Slug Transfer Unit

In order to avoid a prohibitive weight penalty, the missile LO_2 suction plumbing configuration satisfies the engine start transient requirements only when the engine starts with subcooled LO_2 at the booster turbopump inlets. Each subcooled LO_2 slug transfer unit will be validated at the launch site prior to any engine firings. The condition of the LO_2 entering and leaving the unit will be monitored by associated pressure (N1309P, N1310P) and temperature (N1313T, N1314T) instrumentation. A differential pressure measurement across a calibrated venturi (N 3301P), together with a pressure transducer in the storage tank ullage space (N1311P), will indicate the GN_2 flow rate and pressure in the unit. The valve positions (N1335X, N1336X, N1337X, N1338X, N1339X) will be monitored for trouble-shooting and failure analysis information. All the aforementioned instrumentation, except the GN_2 venturi differential pressure measurement (N3301P), will be monitored for operating and post test analysis purposes. (B)

C. Propellant Loading System

The Convair propellant loading system consists of liquid level sensors which indicate propellant covering and uncovering. The four fuel probes are as follows:

Fuel 95% Primary Control (U1207X) signals rapid fill shut-off.
Fuel 95% Secondary Control (U1206X) serves as a back-up to U1207X.
Fuel 100% Primary Control (U1205X) should give a covered indication.
Fuel 100% Secondary Control (U1204X) should give an uncovered indication.
Fuel is tanked between the 100% and over-fill probes.

The four LO_2 probes are discussed below:

LO_2 95% Rapid Load Shut-Off (U1203X) signals termination of rapid fill.
LO_2 Topping Low Control (U1202X) defines the lower limit of the topping band.
LO_2 Topping High Control (U1201X) defines the upper limit of the topping band.
LO_2 100% Slug Cutoff (U1200X) gives a covered indication during slug chilling, before boil-off causes it to uncover.

(B)

DATA GATHERING SYSTEMS

I. INTERNAL DATA

A. Telemetry Systems

1. Atlas Telemetry System

a. General

The Atlas R&D telemetry subsystem utilized on WS107A-1, XSM-65E missiles is the same as that provided for WS107A, XSM-65D AIG missile. Hence there will be three telemeters available for transmitting missile data.

b. Functional Description of Components

(1) Telemeter Package

Three telemeter packages are installed, each of which is a 16 channel FM/FM package, using Research Development Board (RDB) channels 1 through 13, A, C, and E. Each package contains a 35 watt r-f transmitter, frequency multiplexing network, five volt subcarrier oscillators, commutators, inflight calibrator for commutated signals, and a transverter to power the telemeter package using ground or missileborne supplied 28 volt DC. Plug in type concepts allow unused subcarrier oscillators, commutators and associated equipment to be removed from the telemeter package when not required.

(2) Accessory Package

The accessory package contains the transducer power supply used to provide DC voltage for transducers and divider networks, and to provide accurate calibration voltages; and signal conditioning networks. Since ARMA conditions all of their signals only one accessory package is needed for all three telemeters (reference Telemetry System schematic).

B

B

(3) Battery Package

Three remotely activated primary battery packages are utilized, one for each telemeter package. Each battery provides two power outputs, 28 and 7 volts, to the transverters in the telemeter packages and accessory package.

(4) Antenna

There are two telemetering antennas, one located in the forward end of each equipment pod. Each antenna is connected to one of the outputs of the ring coupler. Both antennas use a slot radiator. The basic pattern of the antennas, when mounted on the missile, approximates that of a loop antenna whose plane coincides with the plane defined by the roll and yaw axes.

In order to combine the outputs of the telemeter packages, a system of couplers is utilized. A diplex coupler combines the 35 watt outputs of two telemeter packages into one 70 watt signal. A ring coupler combines the remaining 35 watt telemeter signal with the 70 watt signal from the diplex coupler, and divides the resultant 105 watt signal into two 52.5 watt signals which are routed to the antennas.

c. Atlas Telemeter Circuits

The following is a brief explanation of circuits contained in the E R&D Series.

(1) Direct Input Channels (B)

The first three channels of the telemeter system are of the direct input type. This means that the transducer or function to be measured generates the necessary frequency to modulate the transmitter. The output of the various devices are set at the same level by a potentiometer and then fed through a band pass filter into a common mixing amplifier and amplified to the proper level to modulate the transmitter.

(2) Continuous Channels

All other channels use voltage controlled oscillators. Continuous voltage controlled channels will be discussed first. On these channels only one measured function is applied to the subcarrier oscillator as opposed to commutated channels on which a variable number of inputs are applied to the subcarrier oscillator on a time sharing basis. The continuous channels have 0 to 5 volts sensitivity, voltage controlled oscillators with the exception of telemeter #2 channels 12 and 13 which use ± 2.5 volt oscillators. —(B)

The commutated samples are compared to the injected, highly accurate, calibration voltages. When these samples are superimposed on the information from the continuous channels, the entire channel is calibrated quite accurately. The commutated channel used for this purpose is Channel 11 on Telemeter #2. In addition to continuous direct input signals, the continuous channel subcarrier oscillators also carry "blip" event measurements for accurate time of occurrence determination. These events, such as sustainer and vernier engine cutoff, cause relay closures. These relay voltages are differentiated into blips and superimposed on the continuous data signal.

(3) Commutated Voltage Controlled Channels

Both the continuous and commutated voltage controlled oscillators may be classified as to their input stimulus range. With one exception, all the commutated channels have a standard input voltage range of -1.25 to + 5.0 volts. The voltage between 0 and 5.0 volts represents information. The 0 to -1.25 volt portion is a decommutation pedestal.

Channel 11 of Telemeter #1 has a -0.25 to +1.0 volt oscillator to handle low voltage information. The positive portion of the input voltage range represents information and the negative portion is the decommutation pedestal.

The commutated input circuits are somewhat complicated.

A brief description of each of these circuits is discussed below.

(4) Positive Voltage Inputs

The information signal may be supplied from a potentiometer, some other 5 volt source or from a higher voltage. In the potentiometer type, the setting of the potentiometer, hence the voltage, is varied by a pressure for example. Other voltages from various places in the missile are brought to the commutator segments. Where voltages higher than 5 volts are to be measured, a voltage divider is formed between the three rings of the commutator to reduce the stimulus to a 0 to + 5 volt range. The input signals are applied to the odd numbered commutator segments. A negative voltage is applied to all the even numbered segments (except 56 and 58) as a decommutation pedestal. Calibration voltages are applied to segment 25 (100% calibration from transducer power supply), segment 27 (0% calibration), and segment 29 (50% calibration from the inflight calibrator). Segments 55 through 59 are used for the master pulse or frame sync and carry a 100% calibration signal from the inflight calibrator. (B)

(5) Voltage and Temperature Measurements

Channel 11 of Telemeter #1 is unique in that the subcarrier oscillator range is -0. 25 volts to +1. 0 volts. A combination temperature, negative voltage and positive voltage circuit is used. This allows the limited number of temperature measurements to be made and still fully utilize the channel.

In the bridge circuit three inactive arms of the bridge are in the accessory package. The resistance of the active arm is 500 ohms, using the nominal resistance of the transducer at the low end of its temperature range. The transducers consist of platinum or nichrome resistors whose resistance changes by 100 ohms, that is from 500 to 600 ohms, over a prescribed temperature range. The bridge circuit is designed to give an output of 1. 0 volt from the 100 ohm change. In flight calibration is achieved by substituting 500 and 600 ohms in the active arm of the bridge representing zero and 100% information.

These temperature calibrations are applied to segments 25 (100%, and 27 (0%).

Positive voltage inputs to this channel are made in the same way previously discussed except that none of the voltages are derived from potentiometers. In this way the 100% level of the sync pulse may be used for calibration purposes. In addition, on this channel, segment 29 is 0% (missile ground). Negative voltages are biased to a positive value usable to the oscillator. The negative input voltage range is 0 to -2.4 volts. This is biased against +2.4 volts from the calibrator resulting in an output to the oscillator of 0 to +1.2 volts, which, when loaded with the oscillator input impedance is of the range 0 to +1.0 volt.

(6) Displacement Gyro Measurements

The outputs from the autopilot displacement gyros are conditioned (demodulated) by the displacement demodulator in the accessory package to 0 to +5.0 volts.

(7) Rate Gyro Measurements

The outputs from the autopilot rate gyros are demodulated by the rate demodulator in the accessory package. The outputs of the demodulator (0 to 5 volts) are applied directly to the subcarrier oscillators of Telemeter #1 channels 8, 9, and 10. B

(8) Strobe Light Circuit

Previous to sustainer cutoff, channel C of Telemeter #1 is commutated. At sustainer cutoff, 28 volts is applied to relay K1 from the strobe light package and thus switches the subcarrier oscillator input to the strobe light output.

(9) Crystal Rectifier Unit

A crystal rectifier unit is located in the accessory package. In this unit the inverter voltages are conditioned for telemetering.

UTILIZATION OF 16 CHANNEL FM/FM TELEMETERING PACKAGES

				RF #1		RF #2		RF #3	
CHANNEL	CENTER FREQ. CPS	DEVIA-TION %	FREQUENCY RESPONSE FLAT TO 2% CPS	COMMUTA-TION RATE	SCO INPUT	COMMUTA-TION RATE	SCO INPUT	COMMUTA-TION RATE	SCO INPUT
1	400	±7.5		Continuous	Direct				
2	560	±7.5		Continuous	Direct	Continuous	Direct		
3	730	±7.5		Continuous	Direct	Continuous	5V		
4	960	±7.5	0-14	Continuous	5V	Continuous	5V		
5	1,300	±7.5	0-20	Continuous	5V	Continuous	5V		
6	1,700	±7.5	0-25	Continuous	5V	Continuous	5V		
7	2,300	±7.5	0-35	Continuous	5V	Continuous	5V	Continuous	5V
8	3,000	±7.5	0-45	Continuous	5V	Continuous	5V	Continuous	5V
9	3,900	±7.5	0-59	Continuous	5V	Continuous	5V	Continuous	5V
10	5,400	±7.5	0-81	Continuous	5V	Continuous	5V		
11	7,350	±7.5	0-110	2.5 RPS	1V	2.5 RPS	5V	2.5 RPS	5V
12	10,500	±7.5	0-160	5 RPS	5V				
13	14,500	±7.5	0-220	5 RPS	5V			Continuous	5V
A	22,000	±15	0-660	10 RPS	5	Continuous	5V	Continuous	5V
C	40,000	±15	0-1200	1/8 RPS	5V	Continuous	5V	Continuous	5V
E	70,000	±15	0-2100	Digital	5V	30 RPS	5V	Continuous	5V

Additional Comments: 1. No subcarrier oscillators are used for channels labeled DIRECT; frequencies are generated externally.

2. Voltage controlled subcarrier oscillators are used for all other channels.

d. Utilization of the Atlas Telemetry System

For commutated voltages, channel assignments were made utilizing commutator speeds which will yield a minimum of four samples per cycle which is considered adequate to reconstruct the waveform. In some instances it was necessary to cross connect segments on a commutator to provide desired sampling rate.

A maximum of 27 information (plus sync pulse and 100% calibration using 2-1/2 segments) channels are available from each commutated channel with the exception of Channel C on RF#1. Of these 27 information channels 3 are used for calibration voltages, one of which may be used for the transducer power supply voltage (see commutation waveform illustration). A ground-based decommutator employing ground gating will be employed with all commutated channels with the exception of the channel mentioned. Each commutator wafer will employ 30 segment pairs. (B)

Channel C of RF #1 is a vibration channel. The commutator used also employs 60 segments. The segment pattern (see commutation waveform illustration) consists of six groups of 7 segments tied together with a reference segment between each group. Calibrations of 100% and 0% along with a sync pulse and 100% calibration follow each set of six groups.

Channel C on RF #1 will be switched at sustainer cutoff to the high intensity strobe light system. The channel will be continuous, transmitting the pulses generated by the strobe light system. Special modifications to the telemeter packages have been made in order to transmit various ARMA measurements. A digital channel, RF #1 Channel E, has been incorporated for ARMA computer measurements, this channel is discussed in detail in a following section. Output filters on RF #3 Channels 13, C and E have been modified to pass the ARMA string frequency outputs. Channels C and E, must transmit up to 4800 cps and channel 13 up to 400 cps.

2. Payload Telemeters

a. Avco Series IV FRV4-1

The Avco Series IV FRV4-1 re-entry vehicle instrumentation system utilizes one FM/FM VHF transmitter. This transmitter operating a frequency of 252.4 MC, is not activated until apogee. It transmits real time

data from this point, apogee, to impac An airborne recorder is used to record the data during the blackout portion of re-entry when standard VHF signals become severely attenuated. The recorder is housed in an ejectable data cassette.

Eleven standard IRTWG subcarrier channels are employed, four of which are commutated. The other seven channels carry continuous data. The voltage range used to modulate the oscillators is zero to plus four volts DC for continuous channels except for channel 2 which is not deviated. The presence or absence of channel 2 indicates the data function. Commutated channels use a minus one volt level for decommutation purposes. The commutators contain 60 pins. The data signal assignments are by numbers 1 through 30, the decommutation segments are not numbered.

For calibration purposes data originates with transducers which fall into two categories: voltage-excited types (potentiometer or resistance network), and self-excited types (thermocouple or crystal pickup). Data from voltage-excited transducers require samples of the excitation voltage for calibration while an absolute voltage is required to calibrate the data from self-excited transducers. The regulated +4 volts supplied to the potentiometer-type pickups is also directed through a precision voltage divider to provide 50 and 85 percent calibration points as well as a common 0 percent calibration point. These voltages serve as reference points to calibrate the potentiometer-type transducers. Plus 3.4 volts, derived from the +29 volt supply by means of a voltage divider network, is utilized to obtain an 85 percent of full-scale calibration point for the resistance network-type sensors. The regulated +4 volts is also supplied to a divider which provides 0, 20, and 34 millivolt outputs as an absolute voltage calibration of the low-level thermocouple outputs.

The full-scale output of the thermocouples is 37 millivolts. All the calibration voltages are commutated on the same channel as those on which the data are being calibrated. Transmission redundancy is utilized to provide a means of calibrating data which require continuous monitoring. To accomplish this, six dynamic transducers with potentiometer outputs are transmitted continuously as well as at one sample per second. Calibration is obtained by comparing a sample of the dynamic measurement on the commutated channel with the calibration pulses on that channel, and referencing the information obtained to the continuous channel.

The Series IV FRV4-1 includes a C-band beacon for the purposes of obtaining terminal tracking data. The beacon is turnable over the frequency range of 5400 to 5900 MC with a minimum peak power output of 400 watts.

A non-ejectable Sofar bomb containing approximately 4 pounds of high explosives is mounted in the flare section for the purpose of obtaining impact location data.

b. Avco Series IV FRV4-2

The telemetry system for the Avco Series IV FRV4-2 re-entry is provided by Sandia and Avco. The instrumentation system utilizes two (2) FM/FM VHF transmitters. Both transmitters, designated A (252.4 MC) and B (255.1 MC), are activated prior to launch and transmit data until impact. As on the FRV4-1 vehicle an airborne recorder is used to record the data during the blackout portion of re-entry. The A package contains 13 subcarrier channels 4 of which are commutated. The B package contains 14 subcarrier channels 4 of which are commutated.

The instrumentation system similar to the FRV4-1 vehicle contains a C-band beacon and a Sofar bomb. (B)

c. Avco Series IV FRV4-3

Description of the FRV4-3 vehicle instrumentation system is not presently available to Convair.

d. GE Mark III Mod I

The Mark III Mod I Re-entry vehicle R&D instrumentation system utilizes two (2) FM/FM VHF transmitters. One transmitter, operating at a frequency of 244.3 MC, transmits real-time data from liftoff to impact. From 1 to 3 seconds after fuzing, the real-time transmitter is cleared for the Sandia Mod VI which is used to acquire impact data. The second transmitter, operating at a frequency of 237.8 MC, will continuously play back the mixed subcarrier signal from the storage recorder. The storage recorder, which is a continuous-loop type, will be on from liftoff to impact and will continuously record and play back, the time delay can be varied by using tapes of various lengths.

UTILIZATION OF AVCO SERIES IV FRV4-1 & FRV4-2 TELEMETERS

			FRV4-1	FRV4-2	
CHANNEL	CENTER FREQ CPS	DEVIATION %	COMMUTATION RATE	TLM 'A' COMMUTATION RATE	TLM 'B' COMMUTATION RATE
2	560	Not Deviated	Continuous	NA	Continuous
6	1,700	±7.5	Continuous	NA	NA
7	2,300	±7.5	Continuous	Continuous	Continuous
8	3,000	±7.5	Continuous	Continuous	Continuous
9	3,900	±7.5	Continuous	Continuous	Continuous
10	5,400	±7.5	Continuous	Continuous	Continuous
11	7,350	±7.5	1 RPS	Continuous	Continuous
12	10,500	±7.5	Continuous	Continuous	Continuous
13	14,500	±7.5	1 RPS	Continuous	Continuous
14	22,000	±7.5	NA	Continuous	Continuous
15	30,000	±7.5	NA	5 RPS	5 RPS
16	40,000	±7.5	NA	10 RPS	10 RPS
17	52,500	±7.5	NA	10 RPS	10 RPS
18	70,000	±7.5	NA	10 RPS	10 RPS
(Non-Standard)	83,500	±7.5	NA	Continuous	Continuous
A	22,000	±15	5 RPS	NA	NA
C	40,000	±15	10 RPS	NA	NA

The Mark III Mod I vehicle also includes a C-band beacon which can be used with the AN/FPS 16 radar. The beacon interrogation frequency is 5610 mc and the response frequency is 5675 mc. The beacon will operate from liftoff to impact. Two (2) Sofar bombs are included in the vehicle. Both are body mounted in the flare section and are non-ejectable.

e. GE Mark III Mod II

Description of the Mod II telemetry system is not presently available to Convair.

B. Landline Systems

1. General

The major areas which the complex 11 & 13 landline instrumentation systems will support are:

a. Validation and checkout. (B)

b. Test and launch operations.

c. Post test analysis.

2. Intent

The landline systems will provide visual indication and recordings in the blockhouses of physical and electrical parameters originating in the ground support equipment, launch control, and the missiles. These systems will provide real time data on strip charts for post test analyses.

3. Recorder Types

a. Magnetic Tape

A magnetic tape recording system is used to provide accurate high response recordings. The tape recording capability at complexes 11 and 13 consists of 28 tracks of CEC tape recorders. Because signals are not multiplexed before recording and track 7 on each transport is used for

speed-lock signal and timing code there are actually 26 tracks available for recording data. The response of the tracks range from 100 cycles to 100 kilocycles. At present the tape recorders are utilized solely for ARMA guidance data. See the discussion of guidance measurements for details on tape format.

b. Graphic Recorders

Graphic recorders have either one or two channels of information per recorder. The frequency response is low and therefore limited to recording information from slowly varying functions. Information is easily read in real time on graphic recorders due to data being projected over a wide area. The graphic is the primary recorder used for propulsion and pneumatic system red-line parameter display.

c. Oscillograph Recorders

Oscillographs are used to record functions requiring high frequency response but no real time display.

A photographic method of simultaneously recording up to 36 channels of information (with timing) on continuously moving light sensitive paper is employed. This method provides response to 2000 cps. (B)

d. Sequence Recorders

In addition to analog and frequency measurement requirements, there are event type measurements. Esterline-Angus operations recorders will be used. These recorders will be used to monitor the activations and deactivations of various relays, switches and other types of sequence functions.

4. Recorder Capabilities

Channels of each recorder type at Complexes 11 and 13:

Graphic	64
Oscillograph	144

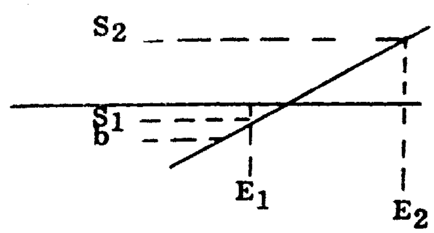
Sequence	160
Magnetic	28

C. Instrumentation Calibration

1. Landline

The calibration technique for instrumentation does away with the need for highly accurate calibration facilities at the test sites. The Standards Laboratory at Astronautics calibrates the transducers which convert the measurement sensed into an analog voltage equivalent. The information from the Standards Laboratory is supplied to Test Evaluation who determines the best straight line relationships (determined by a Least Squares Linear Fit) of the parameter being measured by the transducer and its electrical output. The linear relationship is expressed in slope intercept form and is transmitted to the test sites via IBM tabulations.

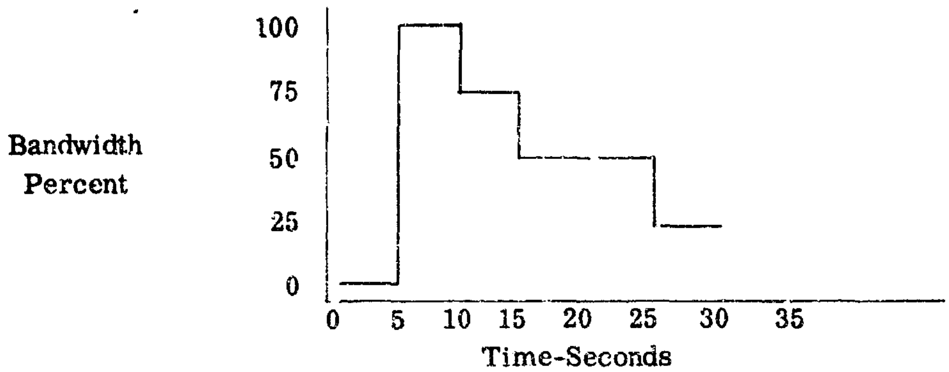
The following equation defines the slope intercept: $y = mx + b$ (B)



S_1 and S_2 are parameters levels and E_1 and E_2 are corresponding transducer output levels.

Because $\frac{S_2 - S_1}{E_2 - E_1} = m$,

the slope of the calibration curve, any calibrated range can be established knowing m and the intercept b, and the related units (i. e., P. S. I. and volts, etc). For landline recorder calibration, and to determine recording system linearity, electrical signals are recorded on each channel just prior to test data. These signals establish a lower and upper limit of the recorder range. Input Calibration Networks are used to generate calibration signals, calculated from slope-intercept information.



In addition to zero and 100% bandwidth signals, 75%, 50%, and 25% signals are normally recorded to establish linearity.

2. Telemetry

Calibration of telemetry data may be divided into two categories, voltage and transducer.

For voltage measurements, accurate calibration levels must be generated for comparison with the data signal. The 100% level is always the commutator sync pulse level. 0% is missile ground.

For measurements requiring transducers, the exitation voltage is required along with the slope intercept data for the transducer for accurate data reduction. 100% calibration is provided on one pin of each commutator.

II. TRACKING DATA

A. General

External tracking data will be obtained to supplement the internal data received from the Convair airborne telemetry system. This will assure a complete evaluation of missile flight performance.

Tracking data should be obtained continuously and recorded as functions of time, direction, and range from the tracking sites. This may be done directly in terms of angles and ranges or indirectly in the form of data requiring mathmetical treatment to yield the desired position information. All tracking data will be referenced

to a Cartesian coordinate system. The velocity of the vehicle may be determined from the tracking systems by means of frequency or range rate changes in the electronic systems, or by means of derivatives of the position data from any tracking system.

The type of tracking system data obtained during successive phases of any particular mission will depend on the capabilities of the vehicle instrumentation and of the existing equipment in the effective range area. The following sections present and briefly describe the more important data gathering systems which may be utilized in fulfilling the range requirements for this missile program.

B. Azusa Data

The Mark I system at Cape Canaveral is the only Azusa tracking site operational at the present time. This is expected to be replaced by the Mark II system by mid-1960. The range of the Mark II system using B-1 coherent transponder is believed to be approximately 1000 nautical miles.

The Azusa system provides data for determination of the position and velocity of the Azusa airborne transponder. Position measurements are expressed in terms of two direction cosines of the transponder with respect to each of two perpendicular horizontal coordinate axes. Range to the transponder is measured from the origin at the intersection of these axes. (B)

The direction cosines are determined through a pair of antennas located at the ends of each baseline. The intersection of the baselines will be the origin of coordinates. The direction cosine is obtained from the measured phase difference of the transponder reply carrier signal at the two antennas. High precision is attained by using antenna baselines which are long relative to wavelength. Ambiguities introduced by the long baseline are partially resolved by the use of two additional antennas separated by fewer wavelengths. The short baseline ambiguities are then resolved by cosine data derived from a conventional conical scan direction finder.

Range is determined by comparing the instantaneous phase of a transmitted modulation signal with the received modulation signal. Maximum resolving power is obtained by selecting a high range modulation frequency. Ambiguities introduced by the high frequency are resolved by transmitting two low frequency modulation components.

Velocity of the airborne vehicle is determined from doppler shift measurements. For this purpose the transponder reply carrier is locked in phase with the 98.3565 KC (Fine Range) modulation signal, which is multiplied 612 times and utilized as a reference within the transponder.

The accuracy of the direction cosine measurements depends on the accuracy of spacing and orientation of the ground station antennas, and the accuracy to which the received carrier is maintained. The baseline accuracy is insured by precision survey measurements. The received carrier frequency is maintained at 5000 MC by automatic frequency control circuits in the ground equipment and within the transponder. Azusa Mark II performance specifications call for angular rates in azimuth of 1 radian per second, elevation of 14 radians per second and cosine of 0.1 per second. The non-ambiguous range resolution is 1.0 foot.

The returned signals from the transponder are converted by the receiving system into a form usable for phase comparison in the indicating system. The analog output data of the indicating system is fed into a data handling system where it is converted to digital form for visual presentation and recording on magnetic tape. Data recorded on the tape will include:

(1) Pre-flight calibration tower data from -60 dbw to -140 dbw in increments of 10 db.

(2) Pre-flight x-tower and y-tower zero set data.

(3) Plotting Board Charts.

(4) Post flight calibration tower data from -60 dbw to -140 dbw in increments of 10 db.

(5) Post flight x-tower and y-tower zero set data.

(6) Phase data playback.

C. Mod III E Trajectory Instrumentation

The missile instrumentation beacons consists of a Rate Beacon, a Pulse Beacon, a common antenna and associated wave guide including low-pass and high-pass filters. These beacons operate in conjunction with related ground equipment to perform instantaneous position and rate measuring functions for impact prediction should the missile follow a ballistic path for the remainder of the flight.

The position tracking subsystem continuously determines missile instantaneous range, elevation, and azimuth heading. The position coordinates are measured by means of a ground based, phase-amplitude, monopulse radar operating in conjunction with the pulse beacon, decoder, and antennas in the missile.

The rate measuring subsystem continuously determines the missile instantaneous rate of change in range, elevation and azimuth heading.

The velocity components are measured by three ground-based c-w. antennas. These are arranged with one central transmitter-receiver antenna and two outlying receiver-antennas. Energy is sent to the missile rate beacon by means of the central transmitter-receiver antenna. The rate beacon replies with a coherent c-w signal radiated back to the three ground antennas. When the missile velocity vector has an angular component with respect to the ground antennas the signal received at one or both of the outlying receiver antennas will be slightly different from that received at the central antenna. The doppler frequency is magnified and sent to the computer subsystem. The computer determines the rates of change in angles by relating this magnified doppler frequency to azimuth and elevation angles.

D. FPS-16 Radar

The FPS-16 Radar is a high precision C-Band monopulse tracking radar which provides data outputs in the form of selsyn voltages. These voltages represent slant range, azimuth and elevation angles. These radars are used to provide real time, present position and impact prediction data for Range Safety. Currently FPS-16 installations are at PAFB, GBI, and Ascension Island.

The digital outputs are recorded on magnetic tape at 10 samples per second. This data includes azimuth, elevation, range, range rate and a timer code. The standard deviation error of the FPS-16 has been approximated as 75 feet in range and 1 mil in azimuth and elevation angle. (B)

E. Missile Impact Location System

The Missile Impact Location System (MILS) is a system for determining the location of missile impacts through the use of underwater sound techniques. Splash detection and SOFAR bomb detection are the two types in use by AFMTC.

(1) Splash Net

The Splash Net near Ascension Island consists of six moving coil hydrophones arranged in a pentagon with a hydrophone near the center. The hydrophones are on the ocean bottom at a depth of approximately 10,000 feet.

The impact of a nose cone on the water surface creates sound energy which emanates in all directions. Some of these rays of energy will reach the hydrophones. Rays which exceed a critical angle will be refracted upward before reaching the bottom. This critical angle will determine the maximum horizontal range over which the hydrophones can detect a splash.

The impact must be picked up by three or more hydrophones to determine the location of a splash. Any splash occurring within the confines of the net can be determined within 0. 1 nautical mile. A splash outside the net but within a 12 mile radius from the net center can be determined within 0. 2 nautical mile. Within 12 to 16 mile radius the accuracy is 0. 5 nautical mile. At a range greater than 16 miles a direct signal cannot be expected to reach the hydrophones and the location of the splash usually cannot be determined.

2. SOFAR Bomb

This type detection monitors the sound of a SOFAR bomb explosion in the vicinity of the ocean depth of minimum sound velocity by means of hydrophones located near that depth. The Splash Net is capable of monitoring both splashes and bombs, whereas the SOFAR hydrophones can only monitor bombs. Due to the greater accuracies achieved with the Splash Net Hydrophones these are used whenever possible. In these cases the SOFAR hydrophones are a redundant system and are used merely as a check for consistency.

The location of a SOFAR bomb detonation requires that signals be received at a minimum of three receiver sites. The source location of one of a family of time difference curve is established by noting the time difference of the last arrival of the signal between any two receiver stations. Repeating this operation between any different pair of receiver stations will determine the source location. (B)

Within a matter of minutes after impact, travel times of the signals generated at the hydrophones by splash and bomb are transmitted to Western Electric by RCA. These values are transformed to estimates of impact and released to AMR within 30 minutes from time of impact.

F. Optical Tracking

1. Cinetheodolites, CZR-1's and Other Launch Phase Instruments

Metric optical tracking system data, that is, quantitative vehicle position and velocity data derived from optical tracking instruments such as cinetheodolites and the CZR-1 cameras, are necessarily limited to the launch and initial powered flight phases of a test by the comparatively low-range capabilities of these systems. It has been the experience of Convair in the evaluation of many past Atlas missile flight tests that this type of metric optical data, although useful as a source of comparison and backup information, no longer fill a real need and should in general be omitted from the E Series requirements. It is not intended to restrict the documentary, engineering sequential photographic

coverage or tracking by the ballistic cameras. The coverage of this type deemed necessary is listed in the Program Requirements document.

2. Ballistic Cameras

The missileborne portion of the optical tracking subsystem is provided on specified SM-65E R&D missiles to aid in the calibration of the Azusa, the instrumentation beacons, and the All Inertial Guidance System.

Location of the missile is determined with ballistic cameras located at each of several tracking sites spaced over several hundreds of miles. Each camera is directed toward the sustainer cutoff, vernier engine correction portion of the missile trajectory. During the period between sustainer engine cutoff and nosecone separation, a high intensity strobe light system is triggered at intervals of approximately once each second. A photographic record is made of the light flashes and the star background. Flash occurrences are telemetered to obtain timing data. Comparison of the photographic records between sites enables the establishment of the x, y and z space coordinates of the missile during the specified time interval.

The missileborne strobe light system is housed in a single package. This package contains a strobe lamp, associated electronics, and a remotely activated "one shot" primary type battery which provides system power. The system is mounted on the forward fairing on the B_1 pod. (B)

G. AMR Tracking Ships

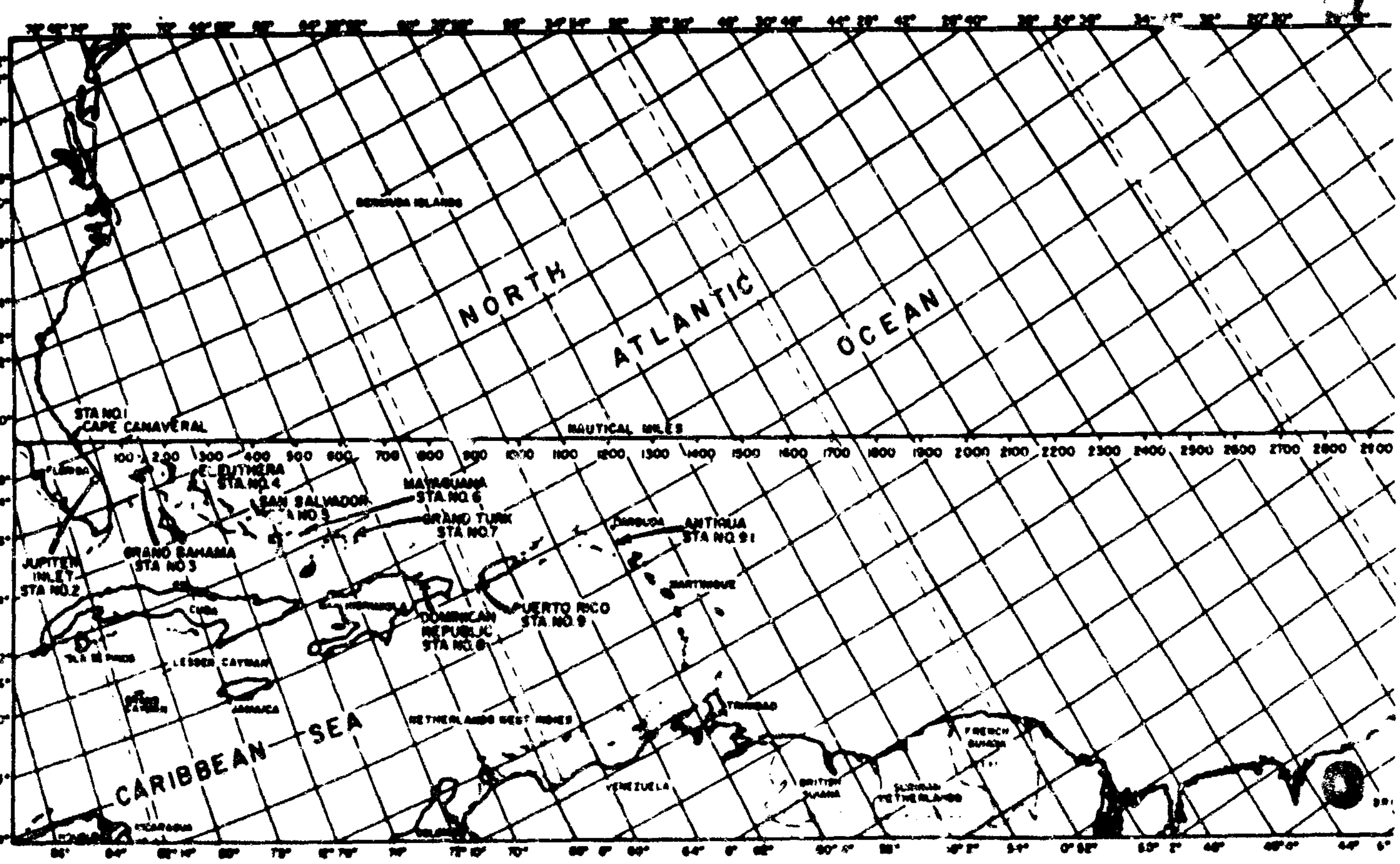
The tracking ships are modified merchant vessels of the Liberty ship class. Each ship carries two radars, in addition to optical equipment for infra-red, visible and ultra-violet observations.

Although the ship is not stabilized, two M-19 gyro compasses will be utilized to stabilize the platforms for the two radars.

The radars have been modified for C-band beacon tracking. They also have provisions for using S-band telemetry for acquisition. They are equipped to measure scintillation spectrum of a target. The radar will be able to pick up the target at approximately 200 miles.

H. AMR ELECTRONIC TRACKING AND

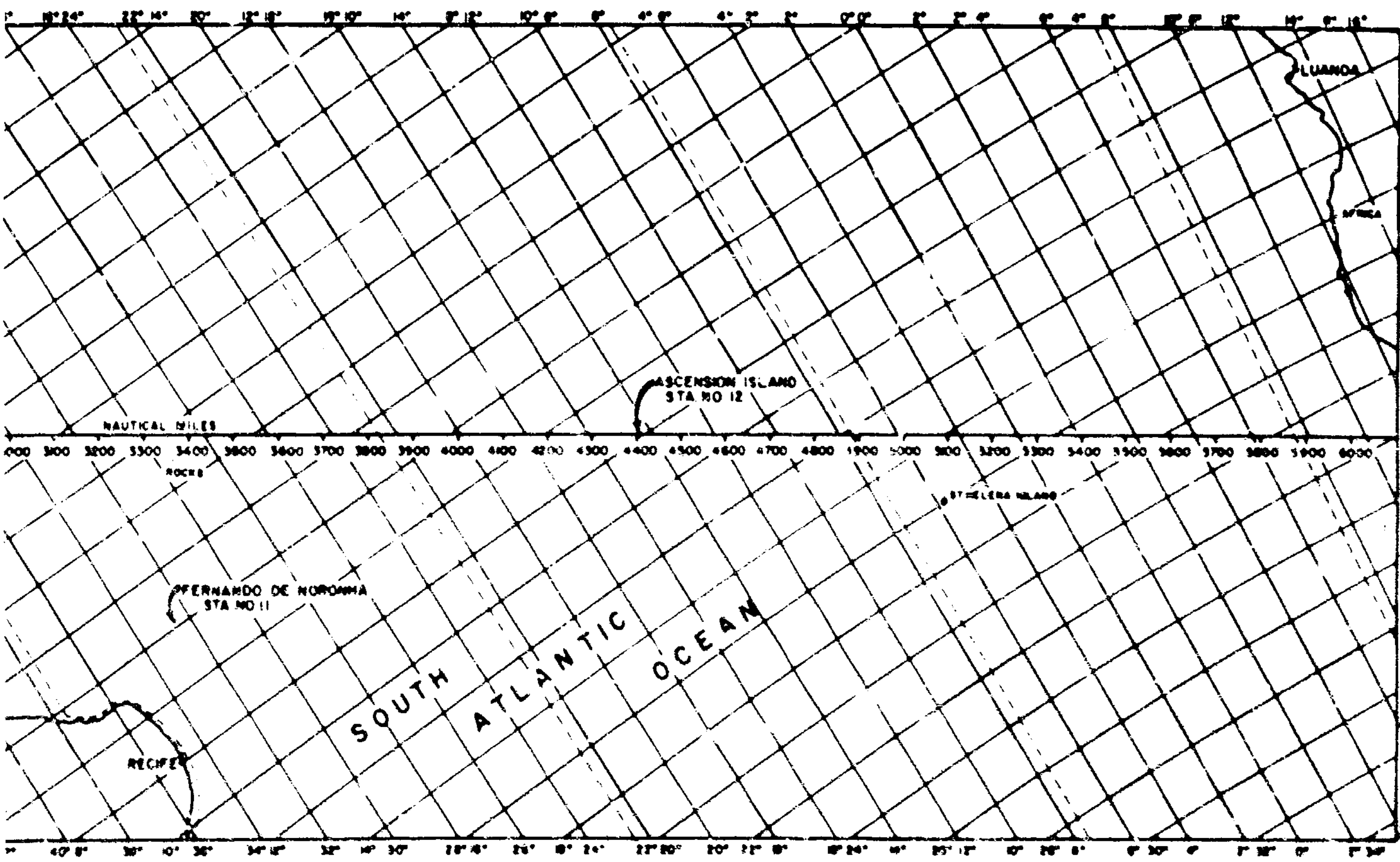
FACILITY *STATION	AN/FPS-16 RADAR	60 FT DISH	MOD II RADARS	TLM & RECORDING SYSTEMS	7-TURN HELIX ANTENNA	TRI-HELIX ANTENNA
1	X	X	X	X	X	X
2				X	X	
3	X			X	X	X
4			X	X	X	
5	X		X	X	X	
6				X		
7			X	X	X	
8						
9	X	X	X	X	X	X
9A				X	X	
11				X		
12	X	X	X	X	X	X



TELEMETRY EQUIPMENT INSTALLATIONS

COTAR	AZUSA	AN/F PS-8 RADAR	COMMENTS
X	X	X	Complete tracking, telemetry, data reduction facilities
			Limited to receiving telemetry
		X	
			Inactive
			Inactive
X			Splash net (MILS) impact location

* See Chart for Station Name & Location



III. SUPPORT DATA

A. General

Support data is defined as that data which cannot be classified as internal or tracking but is of the nature which supplements internal and/or tracking data. Included in this category are: All data gathered to determine the performance of the ground support equipment and site facility system, weather, time, still photographs, movies, launch coordinates, voice, chemical analysis of fuels, computer outputs, etc. A large amount of support data is gathered via the landline instrumentation system which is described in section 4-1 of this report.

B. Engineering Sequential Photos

1. Camera Coverage

Photographic coverage at AMR is the responsibility of RCA. Minimum requirements for adequate engineering coverage on each Atlas flight are considered to be as follows:

a. Four stationary cameras located 90 degrees apart around the missile. The film should be exposed for skin after engine firing and liftoff. Minimum frame rate should be 96 FPS, with an image to frame ratio of 1:1. The purpose of these cameras is to provide engineering data concerning the launcher at liftoff, separation of the umbilicals, and general launch configuration.

b. One stationary camera located on the ramp. The exposure on this should also be for skins after liftoff, with a minimum frame rate of 96 FPS. The frame should include both launcher heads and the booster section to just above the vernier engines. This camera provides valuable data on launcher operation and missile motion at liftoff.

c. Three stationary cameras located 120 degrees apart around the missile. Exposure should be for skin after liftoff and frame rate either 32 or 64 FPS. Image to frame ratio should be 1:2. These cameras furnish data concerning missile motion, and verify the operation of missile systems.

d. A minimum of three tracking cameras with long focal lengths, located in the area so as to provide flight coverage from either side and aft of the

missile throughout booster phase. For daylight flights, the film should be exposed for skin. For night flights, exposure should be for flame. Frame rate should be 32 FPS, with an image to frame ratio of about 1:2 prior to liftoff. These cameras provide information regarding operation of the missile during the booster phase of the flight.

e. In addition to the above coverage, items such as ROTI (Recording Optical Tracking Instrument) and IGOR (Intercept Ground Optical Recorder) are desirable for a complete evaluation of a missile flight.

2. Cameras

a. Mitchell High Speed Camera

The Mitchell motion picture camera (16mm and 35mm) is the standard camera used at AMR for medium and high speed photography. Normally, a four lens turret is used, containing lenses of 25mm to 152mm focal length. Other lenses of longer focal length up to 20 inches are also available for turret mounting, and 40 inch and 80 inch lenses can be used with special mounts. (B)

Range timing is introduced on the outer edge of the film.

b. Fastax Camera

Fastax cameras (16mm and 35mm) are prism type high speed cameras for motion and flame studies. Although capable of higher rates, the maximum frame rate used at AMR is 1000 FPS. Range timing codes are exposed by neon lamps on the outer edge of the film. Interchangeable lenses from 1 inch to 40 inch focal length are available.

c. Milliken Camera

The Milliken camera is a compact 16mm motion picture camera used for studies inside the launcher. A special protective housing is used to protect the camera from environmental effects in this area. A standard 40 frames per foot, 200 foot internal spool load is used. The camera is capable of frame rates of from 16 to 400 FPS. Normally, a 10mm lens is used.

d. Hulcher 70MM Camera

Hulcher 70mm cameras are used for engineering sequential coverage in the pad area. With this coverage, larger size images and greater detail is possible than with smaller film sizes. The cameras use a 7 inch, 12 inch or 20 inch lens, and operate at 10 FPS. The camera running time is approximately 22 seconds.

e. Flight Research Camera

70mm flight research cameras are also used to provide engineering sequential coverage in the pad area. These are intermittent pin registered motion picture cameras. They may be operated at 10, 15, 30, 45 or 60 FPS, in conjunction with a 40, 60, 80 or 120 inch focal length lens. An external 400 or 100 foot magazine load is used, with a 2-1/4 x 2-1/4 film format.

f. Photosonics

The Photosonics full frame 70mm camera is an intermittent pin registered motion picture camera. It uses a variable opening rotary disc shutter with 2° to 120° opening. Operations may be carried out at 10, 20, 30, 40, or 60 FPS. An external 1000 feet magazine load is used with a 2-1/4 x 2-1/4 film format. (B)

C. Closed Circuit Television

This system is used as a supplement to the Launch Control System and the Landline Instrumentation System in monitoring and controlling missile actions.

The basic closed circuit television configuration and capabilities will be supplied by combined contribution of the following major equipment items or their equivalent. The system described below will apply to all complexes.

1. Cameras and Accessories

a. Four remote cameras - RCA #M1-36067

b. Three weatherproof housings - RCA #M1-36075 and one explosion and dustproof housing - RCA #M1-36074B

c. Three outdoor pan and tilt units - RCA #M1-36098 and one explosionproof pan tilt unit - RCA #M1-36098E

d. Three zoom lens (60-300mm focal length) and one (30-150mm focal length). Perkin - Elmer or equal.

2. Monitors and Controls

a. Four 17" - TM 7C monitors - RCA #M1-26141

b. Four 17" - TM 7C slave monitors - RCA #M1-26141

c. Four 1TV - 6A control monitors - RCA #M1-36068A

d. One 19" wide by 21" high remote control panel

3. Required Specification Features:

a. Electrical Characteristics:

Vertical sweep frequency. . . . . 60 cps
Frame frequency . . . . 30 cps
Lines horizontal resolution . . . . . . greater than 500 lines
Camera and monitor bandwidth . . . . 8 mc

b. Mechanical Characteristics:

Pan angle maximum . . . . 320°
Tilt angle maximum . . . . 90°
Pan speed. . . . . 8°/sec
Tilt speed. . . . . 6°/sec

c. Environmental Capabilities of Camera:

Vibration and shock . . . . ruggedized type
Ambient noise level . . . . mounted to attenuate over 175 db
Temperature . . . . min 30° to + 50° C
Humidity. 100%
Sensitivity minimum light level. . . . 1. 5 candles

See the illustrations section of this report for configuration of cameras, monitors and controls.

D. Visual Panel Meter Presentations

A list of visual meters has been compiled and is presented in the composite and landline tabulations in order to provide a more complete picture of the important monitoring devices which will be available to test personnel in their maintenance of blockhouse test control. In order to differentiate these functions from the "1000" series direct line measurements, a "M000" series designation will apply to these visual panel meter presentations. (B)

E. Timing Code

At AMR a 12 bit, 100 PPS, 1000 cycle amplitude modulated carrier timing code with a recycling time of 15 minutes is used. The time word is contained in the 12 bits, 4 bits for each of three digits contained in the time word, and the 100 PPS are amplitude modulated on a 1000 cps carrier. The AM modulation is 3.3 to 1 with the pulses at a 10 volt level and the no pulses at a 3 volt level. The three digits represent units, tens, and hundreds of seconds by using a binary-coded decimal (8-4-2-1). A reference pulse always appears first and indicates the beginning of the time word. The leading edge of this pulse is the point on the chart at which the time occurred. No other part of the time word is time coherent. To read the code one must recognize the difference in pulse widths of three types of pulses: the reference pulse is five units wide, a binary "1" is three units wide, and a binary "0" pulse is one unit wide. The zero time reference for missile launchings is one inch motion in contrast to "D" series which uses two inch motion as its initial time. See the illustrations section for a sample of the timing code with a graphic explanation.

F. Weather Data

All weather data is collected and evaluated by the AMR staff weather officer. A complete surface observation is made at T-time. Upper air soundings are made at the Cape and at various down range stations. The following data has been requested for E series flight tests.

Data Required	Range Required	Accuracy Required
Pressure	Surface	2 MB
	0 to 200,000'	± 2% to 60,000'
		± 5% above 60,000'
Temperature	Surface	± 2°C
	0 to 200,000'	± 2°C
Humidity	At launch point	± 5%
Wind Speed	0 to 200,000'	10 FPS
Wind Direction	Surface	± 10°
	0 to 25,000'	± 5°
	25K to 45K	± 5°
	45K to 200K	± 5°
Cloud Cover	Vicinity of each range station	0.1%
Visibility	Vicinity of each range station	0.5 NM Less than 10 NM, 1 NM greater than 10 NM
Precipitation	At launch	0.05 IN

G. Ionospheric Sounding

Electronic density (electrons per cubic centimeter) at vernier burnout altitude is required to make preflight corrections to the Mod III Instrumentation System computer. Tabulations of electron density versus altitude have been requested to be derived from samplings made at GBI and San Salvador.

(B)

DATA HANDLING, PROCESSING AND REPORTING REQUIREMENTS

I. DATA HANDLING

Atlas Flight Test Data gathered by the range will be handled according to the nature of the data. In general, the normal data handling procedure is as follows:

A. Telemetry Records

AFMTC recorded tapes will be made available to the Flight Test Working Group (FTWG) within one hour after the flight for quick-look analysis. The telemetry tapes recorded at the downrange stations will be identified (station number, date, test number) and flown to the Cape. Here they will be copied and distributed as required.

Telemetry tapes from Station Nos. 1 (Cape) and 3 (Grand Bahama Island), will be flown to San Diego for processing within 24 hours after the flight. Tapes from the remaining stations are not normally required by Convair for post-test analysis.

B. External Data

Data which is gathered by means external to the missile, i.e., other than the RF telemetry link, is referred to as external data. This is conveniently separable into the categories of landline data, metric data, documentary data, and miscellaneous data. (B)

1. Landline Data - These are gathered via graphic, Esterline-Angus and oscillograph recorders. The original recordings will be flown to San Diego within 24 hours to aid in the test analysis.

2. Metric Data - All metric tracking data (including that obtained from film, electronic and optical tracking devices) will be reduced and distributed by the range. Tabulated data, IBM cards or tapes will be distributed as required. (See range data tabulation.)

3. Documentary Data - Sequential and motion picture film will be processed by the Base. Normally, copies will be received at San Diego within 96 hours. Logs of system operation are kept during countdown operation and missile flights, for certain of the missile systems. These will be copied and sent to San Diego for historical purposes.

4. Miscellaneous Data - Included in this category are various recordings made to obtain additional information on the electronic missile systems, range safety information, special studies and weather data. Normally, this data will be returned to San Diego for processing and analysis.

II. DATA PROCESSING

Processing of the original telemetry tapes, recorded by the range, from Station Nos. 1 and 3 is normally considered sufficient for data analysis.

The recorded telemetry data will be gathered on a 1/2 inch, 7 track tape recorded at 60 inches per second. A typical tape format is as follows: (B)

Track 1:	RV RF #1
Track 2:	CV-A RF #2
Track 3:	CV-A RF #3
Track 4:	Voice Annotation (modulates a 70 KC subcarrier and identifies tape), 17 KC (± .1%) speedlock, range timing (13 bit, 1 PPS; 12 bit, 100 PPS), 100 KC and 50 KC compensation signals, signal strength of each link frequency
Track 5:	100 KC and 50 KC compensation signals
Track 6:	CV-A RF #1
Track 7:	RV RF #2

The telemetry tapes will be processed by the ICS San Diego and Florida data processing stations. Here the data will be played back in a form suitable for analysis.

III. TEST REPORTING

A. Countdown TWX'S

TWX's will be sent for each test during which engine ignition is planned or for any special test so designated by the Chief of Field Test Engineering. The TWX's will be sent as follows:

1) At the initiation of the countdown with a description of the test, planned countdown time, name of test conductor and weather outlook at launch and impact sites for flight tests. Each TWX for any one operation shall be serially numbered.

2) Once every 60 minutes if the count is proceeding satisfactorily.
3) At the initiation of each hold, with the reason for the hold and an estimate of hold time.
4) At the initiation of the count following each hold.
5) Continuous transmission during the last 15 minutes of the count.

B. X + 1 Hour TWX

An X + 1 hour report is required for each test conducted at any site in which ignition is planned or for any special test so designated by the Chief of Field Test Engineering. This requirement also applies to aborted tests and incidents or accidents.

In the event that the countdown was aborted prior to engine ignition and all details of the abort are included in the X + 1 report, then this report will close out the TWX cycle for the test.

The following information will be reported in the X + 1 hour TWX:

1. type of test
2. complex identification
3. missile number
4. test number (s)
5. date and time of test
6. test durations, both planned and actual, actual can be approximated
7. type of cutoff
8. visual hardware comments
9. preliminary comments on any difficulty, either from panel operators or from real time records, if available
10. preliminary impact point and source of data (for flights)

C. X + 5 Hour TWX

This TWX is an extension of the X + 1 hour report. It is to contain any additional hardware comments and any significant analysis comments based on available data. No attempt shall be made to draw any conclusions from the data in the event of any system malfunction. If the data indicates any anomalies, then the abnormal variation of the data shall be described. (B)

D. X + 24 Hour Preliminary Report

This report is required for any test in which engine ignition is planned or for any special test so designated by the Chief of Field Test Engineering.

The following information will be reported in the stated order.

1. A paragraph or two summarizing the test.
2. A writeup on the operation or performance of each system. The order of systems is arbitrary, however, systems with difficulties should be presented first.
3. A writeup on the countdown including the time of start of the count, planned countdown time, actual countdown time, and a description of each hold, including hold time and recycle time if any.

E. FRF or Flight Test Working Group Report

This report is the requirement of the Flight Test Working Group for a flight or Convair management for an FRF conducted at AMR on the Atlas program. The report is required within 14 days after a test. This report will include but not be limited to:

1. Summary
2. Test Objective Status
3. Trajectory Data (if a flight)
4. Analysis of all Systems' Performance
5. Film Review Comments
6. Conclusions and Recommendations
7. Countdown History
8. Missile Configuration
9. Missile History
10. Appendix including.

    a. Reference Documents
    b. Serial Numbers of System Components
    c. Significant Dates of Series A, B, C and D Testing
    d. Test Constants
    e. Redline Values Versus Recorded Data

(B)

F. Test Evaluation Report

This is the final flight test evaluation report as required by contracts, Air Force directives and Convair management. This report is required 14 days after the flight date.

The following information is included.

1. Summary
2. Test Objective Status
3. Trajectory Data
4. Systems' Performance Analysis
5. Flight Test Configuration
6. Configuration Comparison with Previous Test Articles
7. System Components and Serial Numbers
8. Summary of Preflight Tests
9. Test History
10. Difficulties Report
11. Countdown Time versus Events

G. Summary Reports

This report summarizes a group of tests and is required by contractural agreements and/or by Convair management. For flight testing, three summary reports were issued upon completion of the Series A, Series B and Series C programs respectively. The number of Series D flights dictates that two summary reports will be issued for the D program for more current effectiveness. In general, summary reports are due eight weeks after completion of the last test in the series. (B)

TEST REPORT SUMMARY

REPORT	PREPARED BY	SIGNED BY	DISTRIBUTION
Countdown TWX	Site	Base Manager or Chief Test Conductor	W. W. Withee, P. J. Lynch, A. D. Mardel, H. R. MacDonald, C. A. Walruff, J. R. Dempsey, W. L. Young, M. Rosenbaum, W. H. Patterson, C. S. Ames, W. L. Van Horn, J. L. Bowers, H. F. Dunholter, C. T. Newton, J. S. Harrison/K. E. Newton, H. O. Welty, R. J. Blake, J. T. Porterfield/J. H. Kelley
X + 1 Hour TWX	Site Data Group	Chief Test Conductor	Same as above.
X + 5 Hour TWX	Site Data Group	Chief Test Conductor	Same as above.
X + 24 Hour Report (Preliminary Test Results)	For AMR FRF Site Data Grp For AMR Flight Test Evaluation	Chief Test Conductor Test Evaluation	Convair Management, CVA Field Offices in Wash., D. C. etc., Project Office, Design Grps., Support Grps., Test & Support Grps. at all sites, Associate Contractors, CVA AFBMD Representative. Master distribution lists for approx. 165 copies are on file in Test Evaluation.
FRF or FTWG Report	Site Data Grp	Flight Test Working Grp. or Chief Test Conductor for an FRF	Flight Test Working Group, Test Evaluation, and all test site libraries.
Test Evaluation Report	Test Evaluation	Assistant Chief Engineer - Test, and Chief Engineer	Same as X + 24 Hour Report, plus contract requirements.
Summary Report	Test Evaluation	Assistant Chief Engineer - Test, and Chief Engineer	Same as Test Evaluation Report

B

OPERATING INSTRUMENTATION CONSIDERATIONS

E series operating instrumentation required for flight articles, at present, is under review. The tabulation of operating instrumentation included in this report and the following discussion should be considered in this light.

Operating considerations as discussed in the following paragraphs are limited to those measurements visually monitored to verify proper performance of missile systems. It should be noted that most missile parameters required to insure proper missile conditions are presented on panel lights and meters and as such are not covered in this discussion. However, a list of panel meters for operating measurements can be found in the panel meter missile instrumentation composite and the individual missile landline tabulations.

In general, operating measurements may be divided into two categories for flight missiles:
1. Those necessary for validating or checking out a system prior to missile countdown, and
2. Pre-start operating measurements to which prescribed limits are set and which require corrective action or discontinuance of the countdown if prescribed limits are exceeded.

Operating limits and missile effectivity are indicated in the operating instrumentation tabulation.

		Valid	Pre-Start Redline
F 1001 P	LO_2 TANK HELIUM		X
F 1003 P	FUEL TANK HELIUM		X

Tank pressures must be maintained within specified limits to maintain missile structural integrity. Str.. chart recordings of these pressures furnish a real time record upon which corrective action can be based.

		Valid	Pre-Start Redline
F 1246 P	BOOSTER TANK HELIUM BOTTLE HI		X
F 1145 P	S CTL HELIUM BTL		X

These measurements assure that the airborne helium bottles are properly pressurized prior to missile firing. In case of a missile abort, bottle pressure data can be monitored to verify that the bottles are in a safe condition.

		Valid	Pre-Start Redline
N 1310 P	SLUG CH LO_2 DISCH	X	X
N 1314 T	SLUG CH LO_2 DISCH	X	X

To insure that the slug chill unit transfers sufficient LO_2 at the proper temperature, and to insure no excessive pressure build up in the slug chill unit, the above measurements are monitored.

		Valid	Pre-Start Redline
N 1335 X	SLG CH LO_2 DISCH VLV	X	
N 1336 X	SLG CH LO_2 VENT VLV	X	
N 1337 X	SLG CH LO_2 INLET VLV	X	
N 1338 X	SLG CH LN_2 INLET VLV	X	
N 1339 X	SLG CH GN_2 INLET VLV	X	

The above measurements are made during validation of each slug chill transfer unit to insure that valves have functioned properly and in the correct sequence.

		Valid	Pre-Start Redline
P 1474 P	VERN CTL REG DISCH	X	X

The purpose of this measurement is to verify proper regulator setting prior to missile firing.

		Valid	Pre-Start Redline
S1122V	SERVO TEST SIGNAL	X	
S1107V	B1 PCH ACTR FEEDBACK	X	
S1108V	B2 PCH ACTR FEEDBACK	X	
S1113V	V1 YAW ACTR FEEDBACK	X	
S1114V	V2 YAW ACTR FEEDBACK	X	

2

		Valid	Pre-Start Redline
S1118V	V2 PCH ACTR FEEDBACK	X	
S1119V	V1 PCH ACTR FEEDBACK	X	
S1128V	B1 YAW ACTR FEEDBACK	X	
S1129V	B2 YAW ACTR FEEDBACK	X	
S1216V	S PCH ACTR FEEDBACK	X	
S1217V	S YAW ACTR FEEDBACK	X	

The servo test signal furnishes data on the input to the servo amplifier loop of the autopilot. The actuator feedback voltages when compared to the input signal provides information on engine threshold, frequency response, system continuity, gain and polarity.

S1121V	GYRO TEST SIGNAL	X	
S1147V	PITCH GYRO AMP OUT	X	
S1148V	YAW GYRO AMP OUT	X	
S1149V	ROLL GYRO AMP OUT	X	

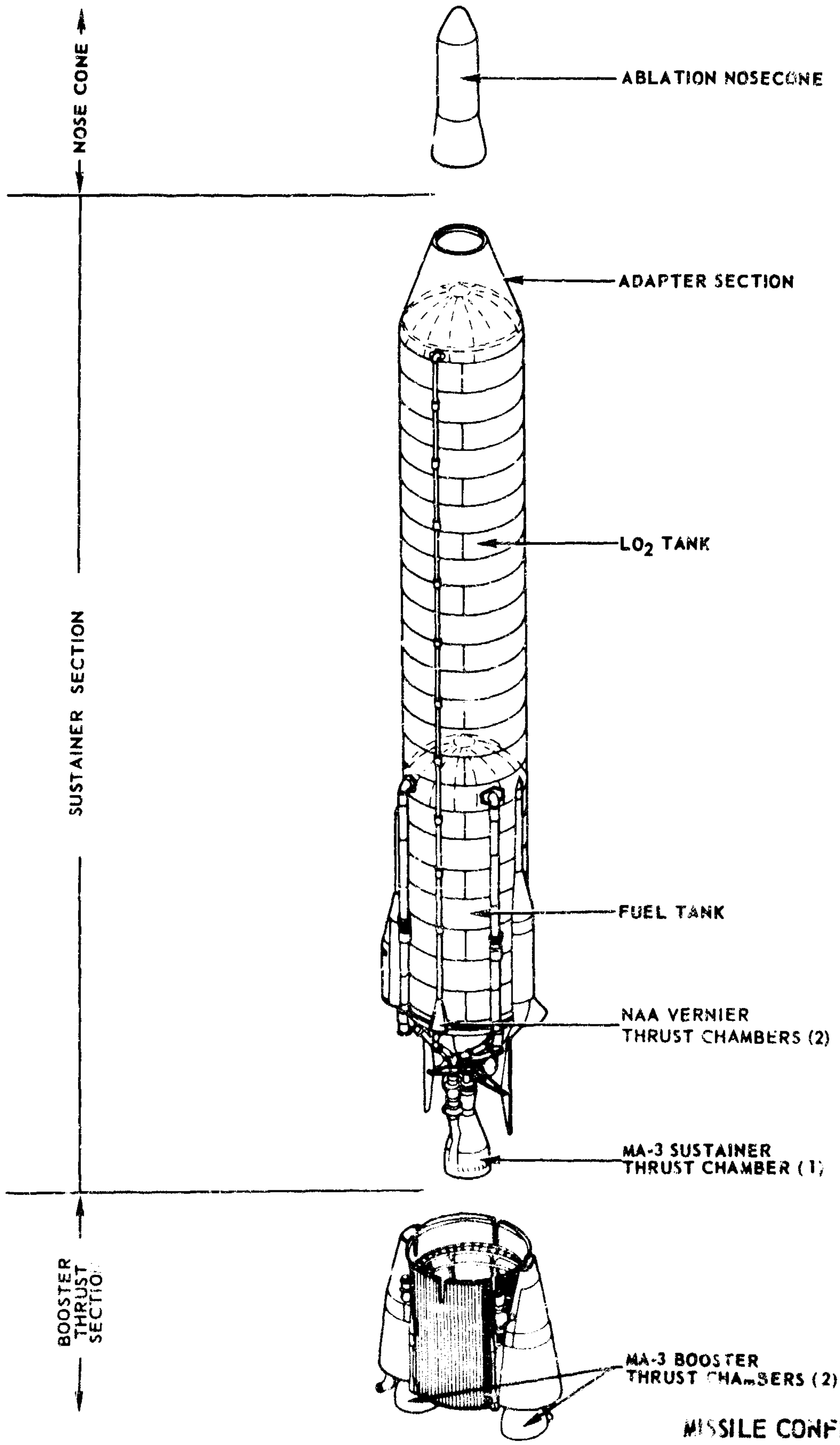
The gyro amplifier output signals when compared with the gyro test signal provides a check on proper displacement gyro operation. These outputs will also indicate the rate gyros are operable when a form of the "kick test" is performed. In addition, this instrumentation indicates frequency response system continuity, gain and polarity.

S1048V	PROGRAMMER PITCH SIGNAL	X	
S1049V	PROGRAMMER ROLL SIGNAL	X	
S1235X	PROGRAMMER RUN TIME	X	

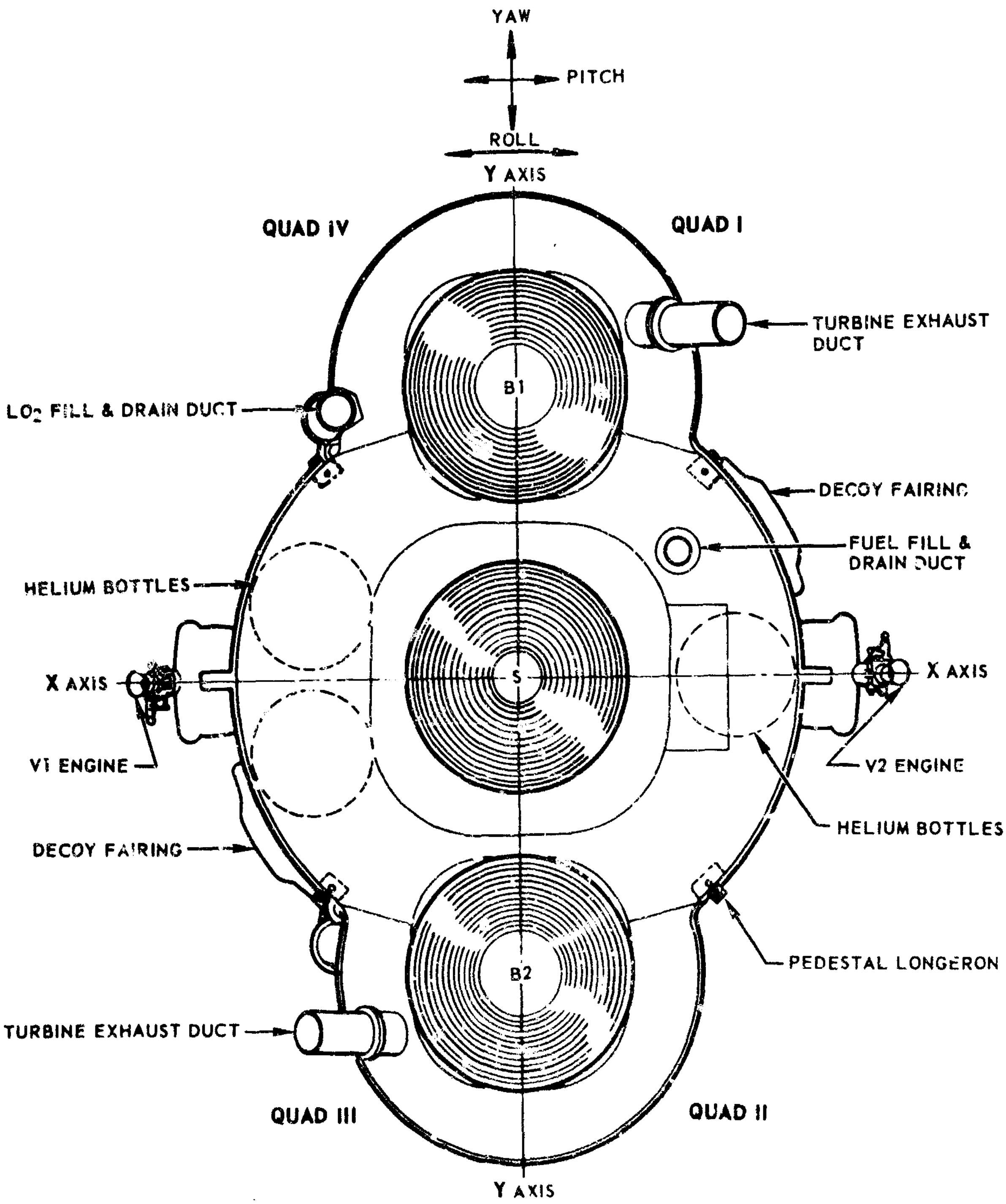
Confirmation of programmer operation and sequencing is accomplished by running the programmer at 10 times normal speed and monitoring the outputs for voltage level and time of occurrence. The above instrumentation provides part of this information. (B)

Note: Additional autopilot parameters which could affect testing are monitored but not recorded. Meters are used to indicate power supply current and voltage.

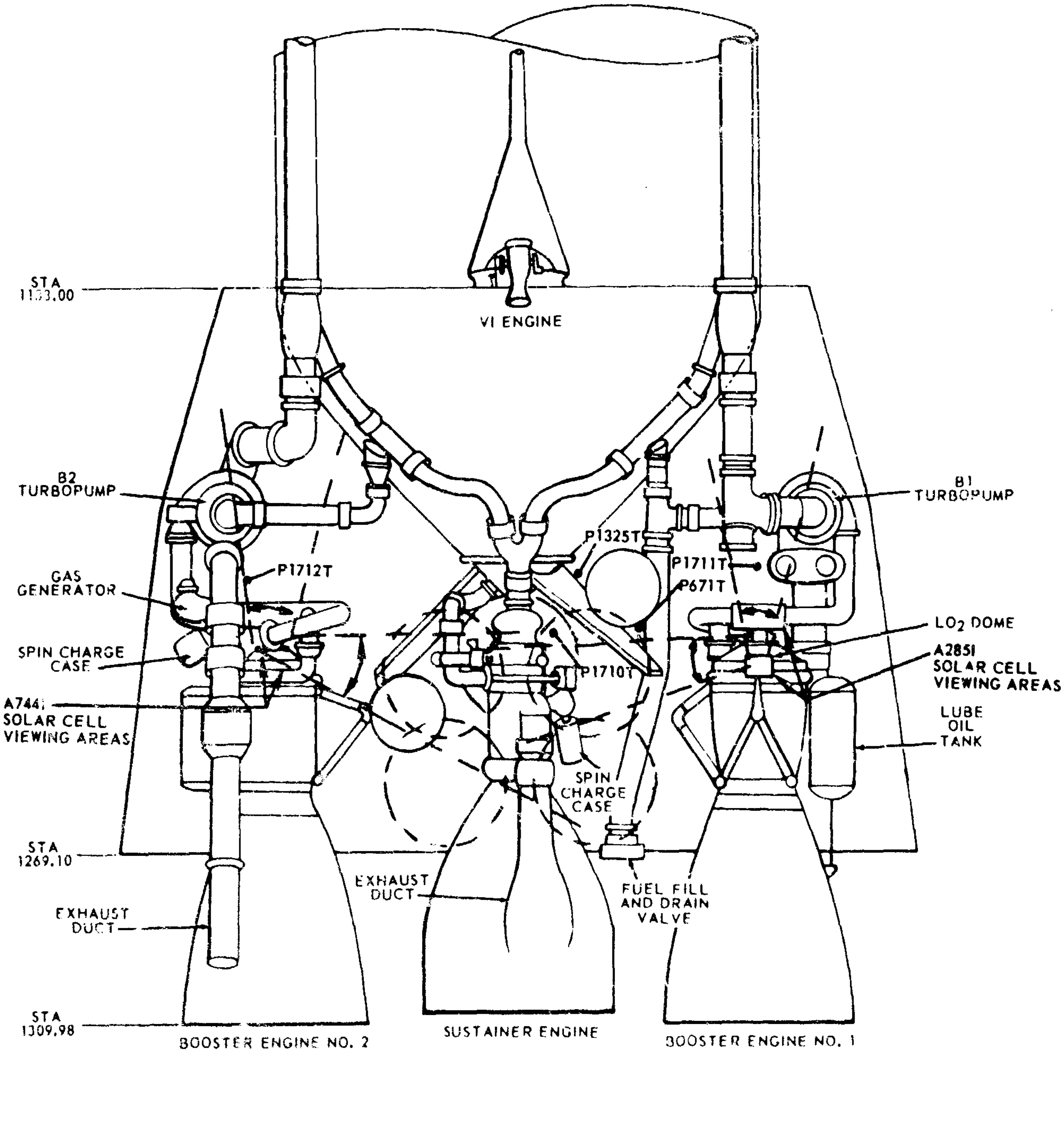
ILLUSTRATIONS



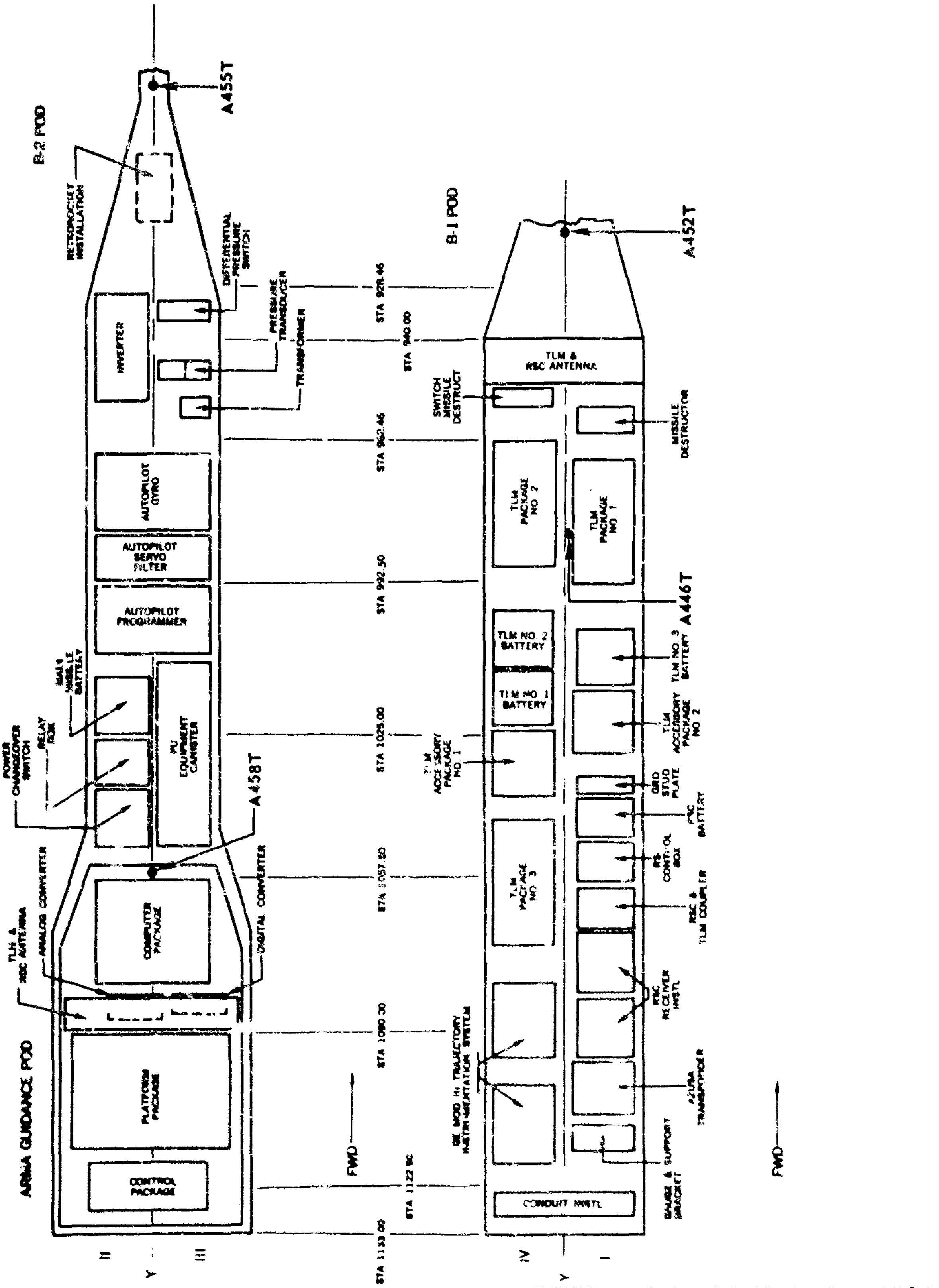
MISSILE CONFIGURATION



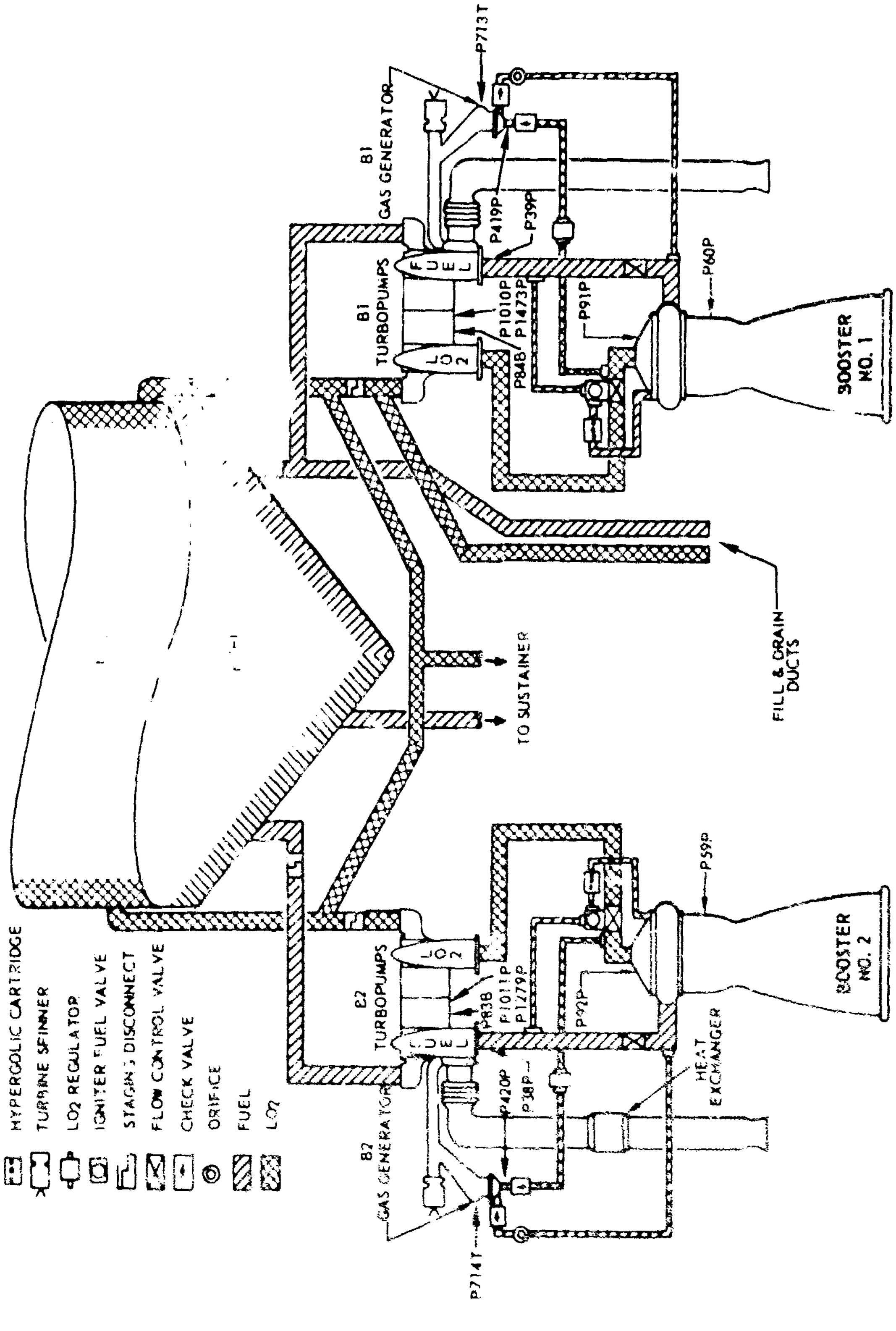
MISSILE ORIENTATION SKETCH



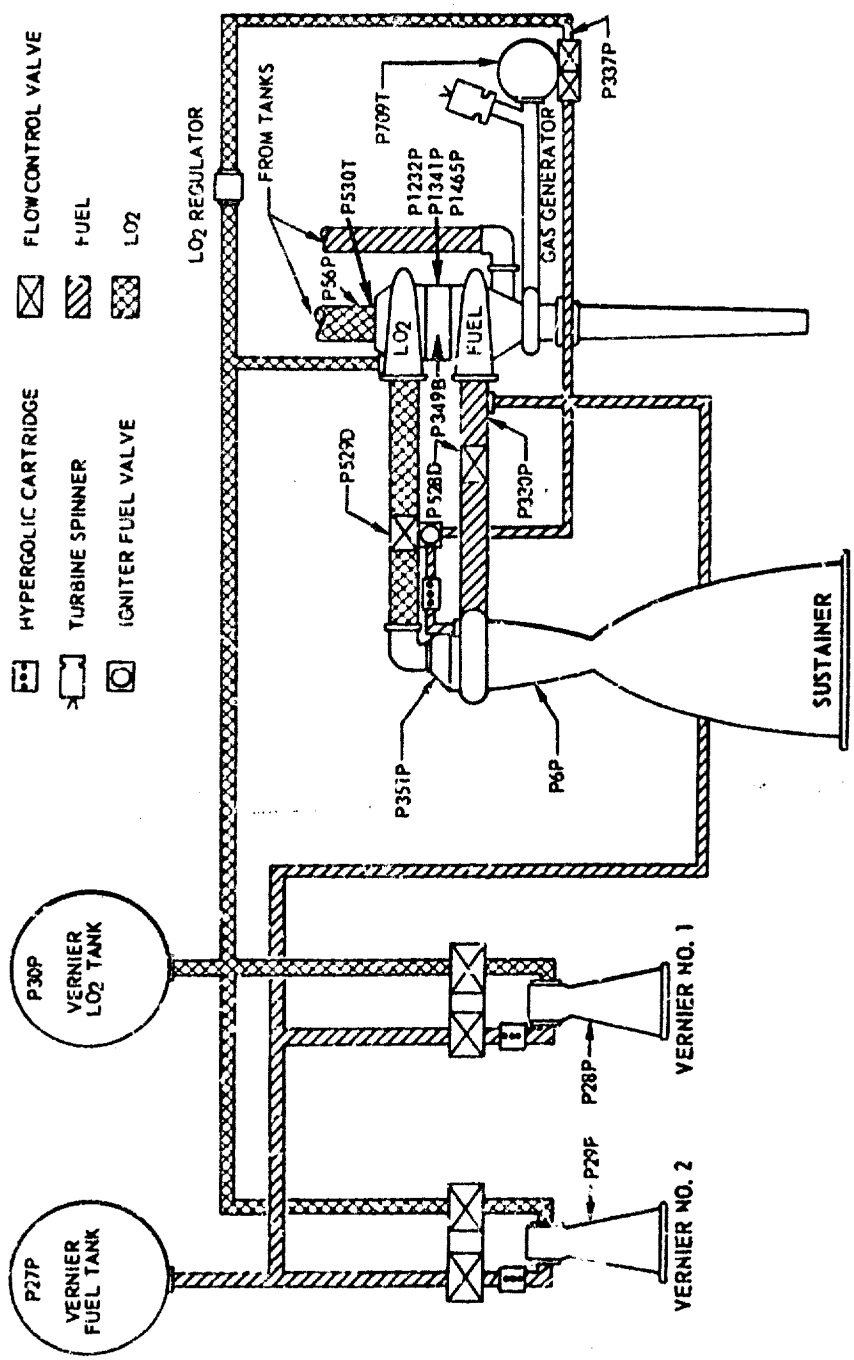
MA-3 ENGINE COMPARTMENT INSTRUMENTATION



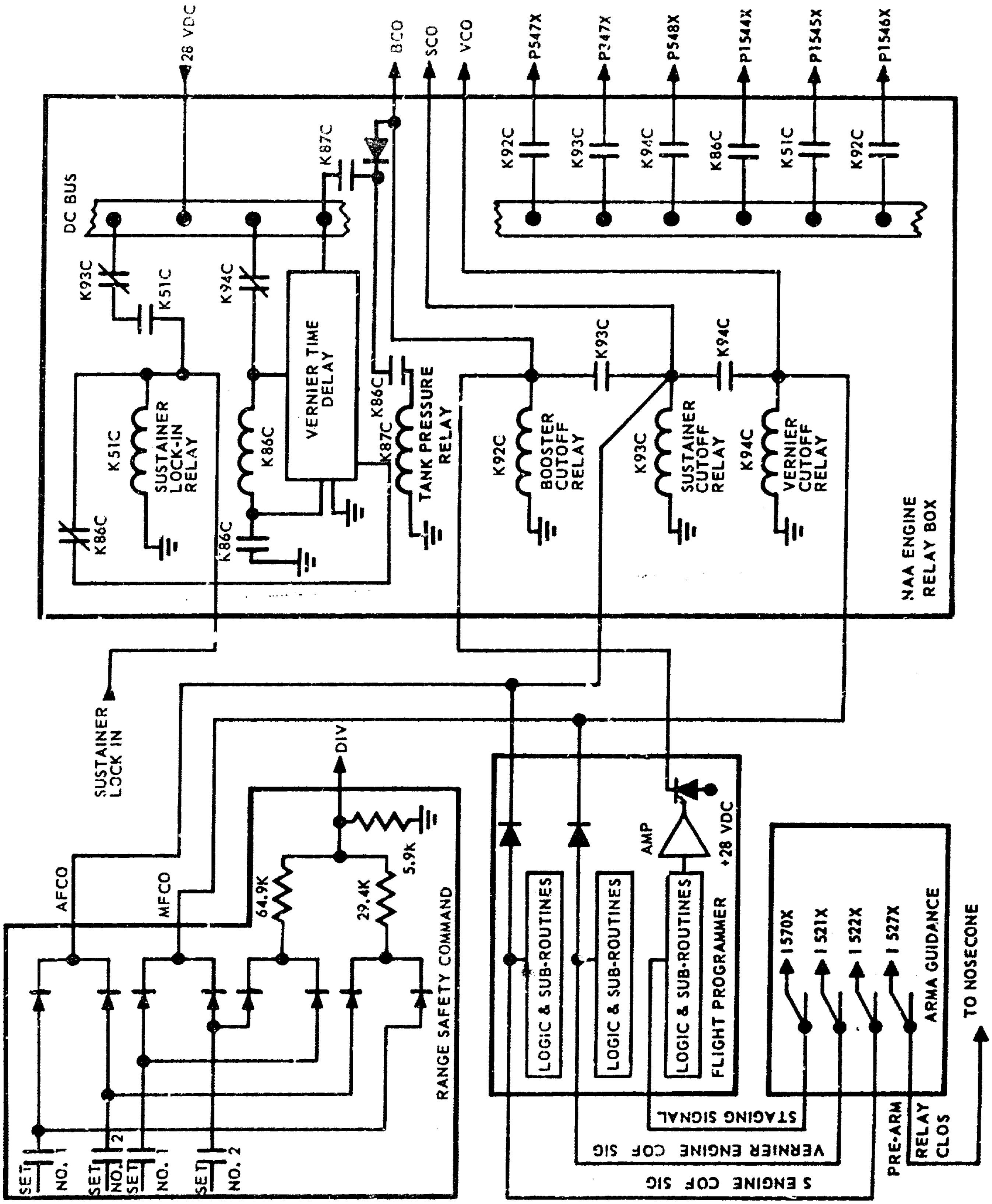
EQUIPMENT PODS INSTRUMENTATION



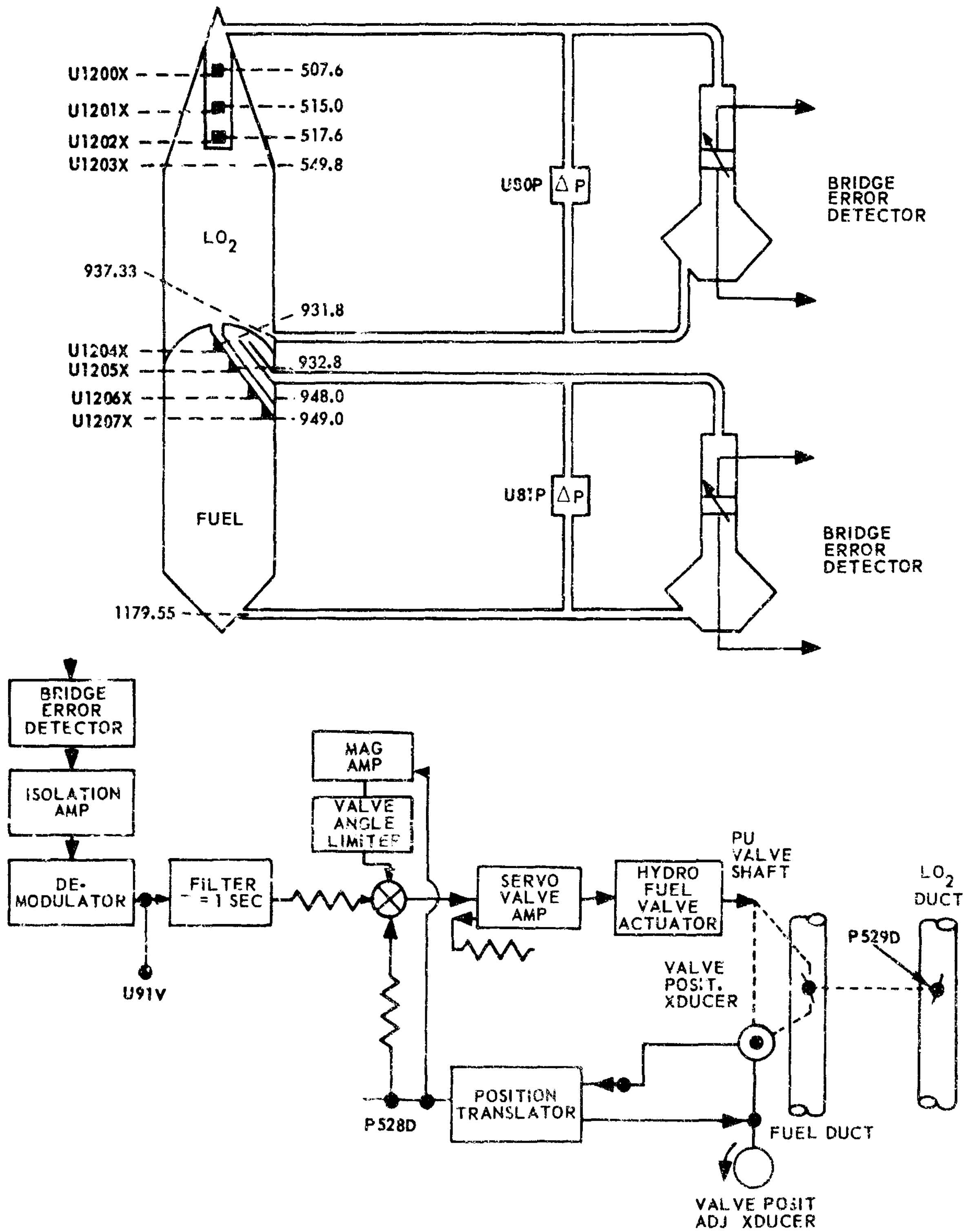
BOOSTER ENGINES



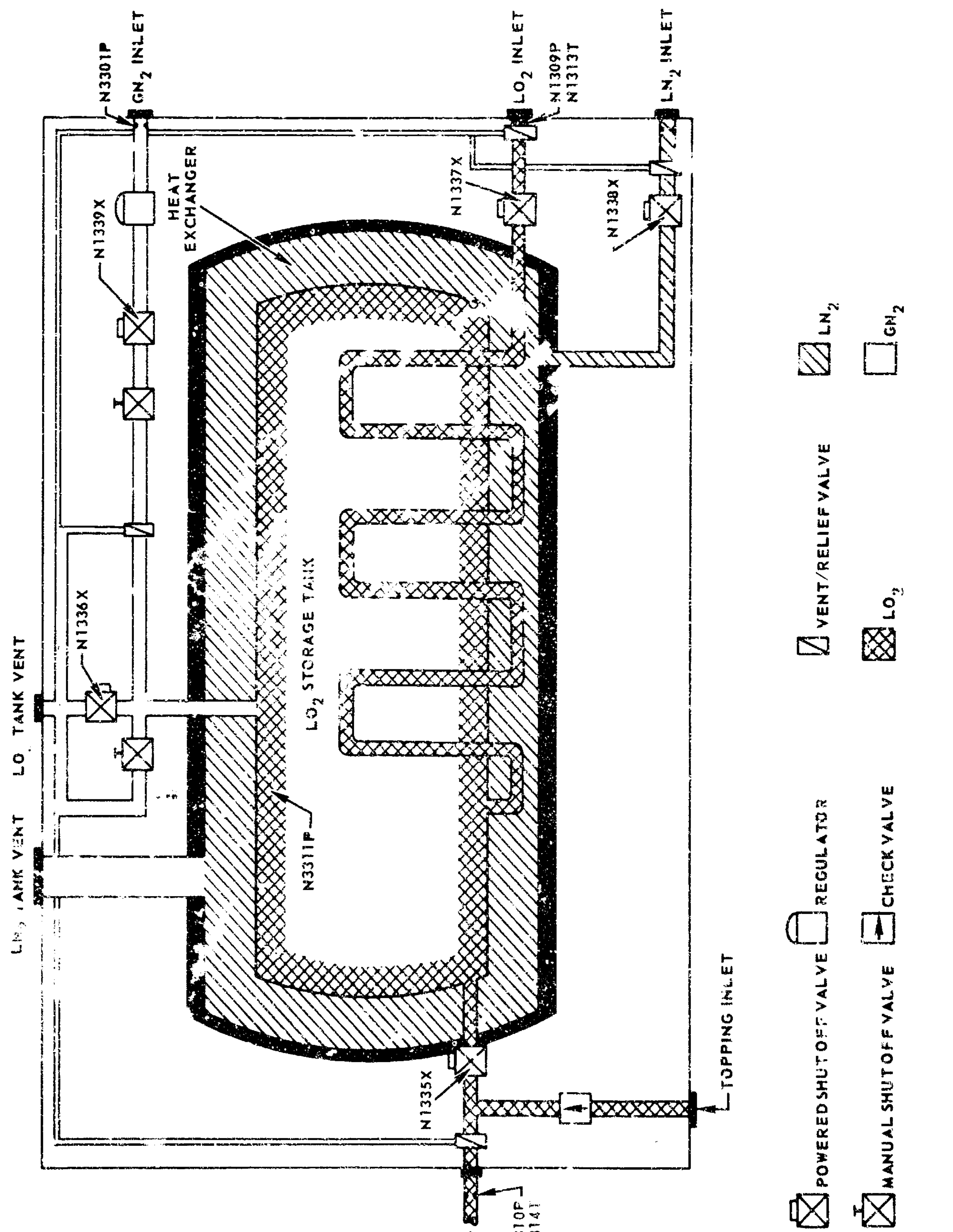
SUSTAINER AND VERNIER ENGINES



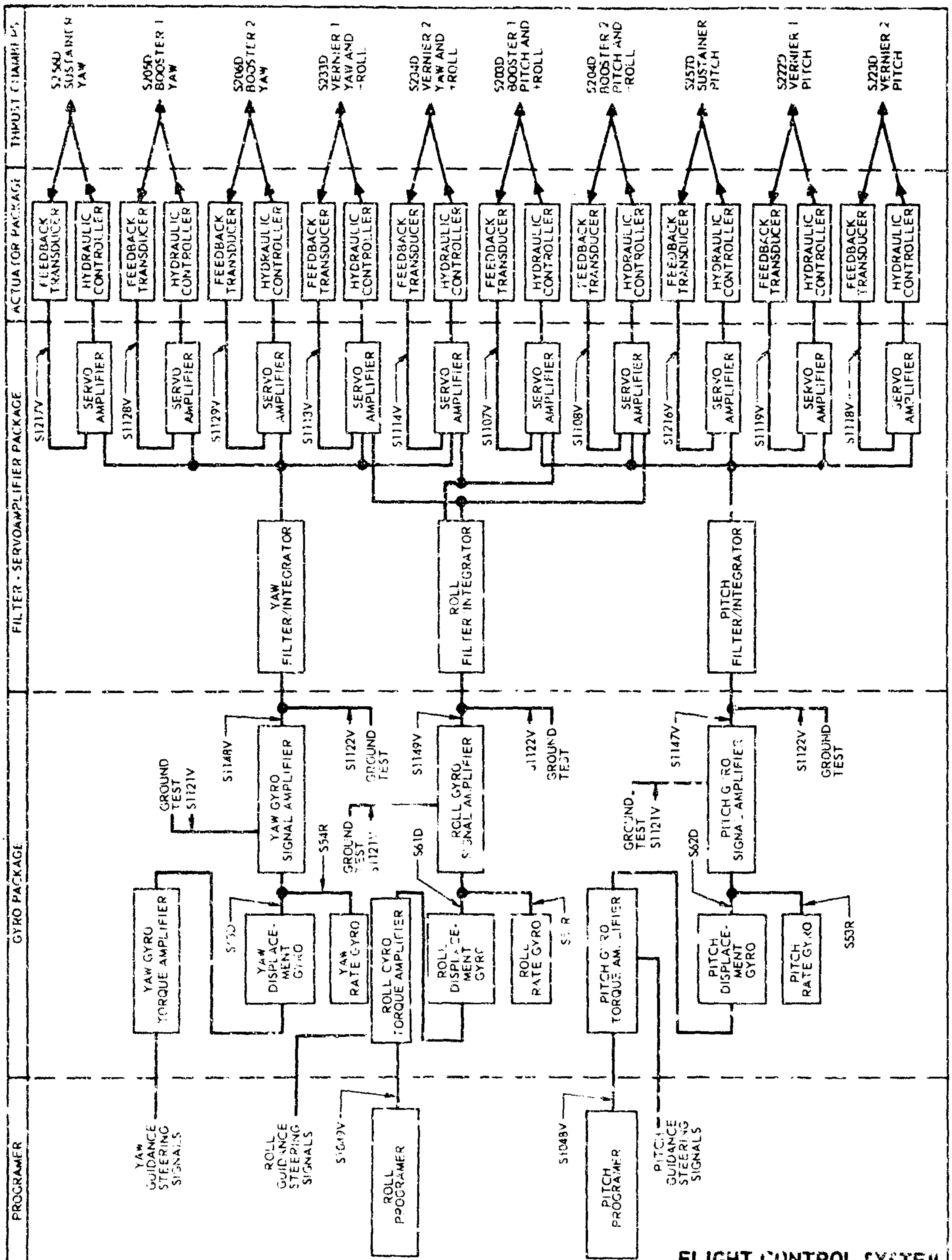
ENGINE CUTOFF INSTRUMENTATION



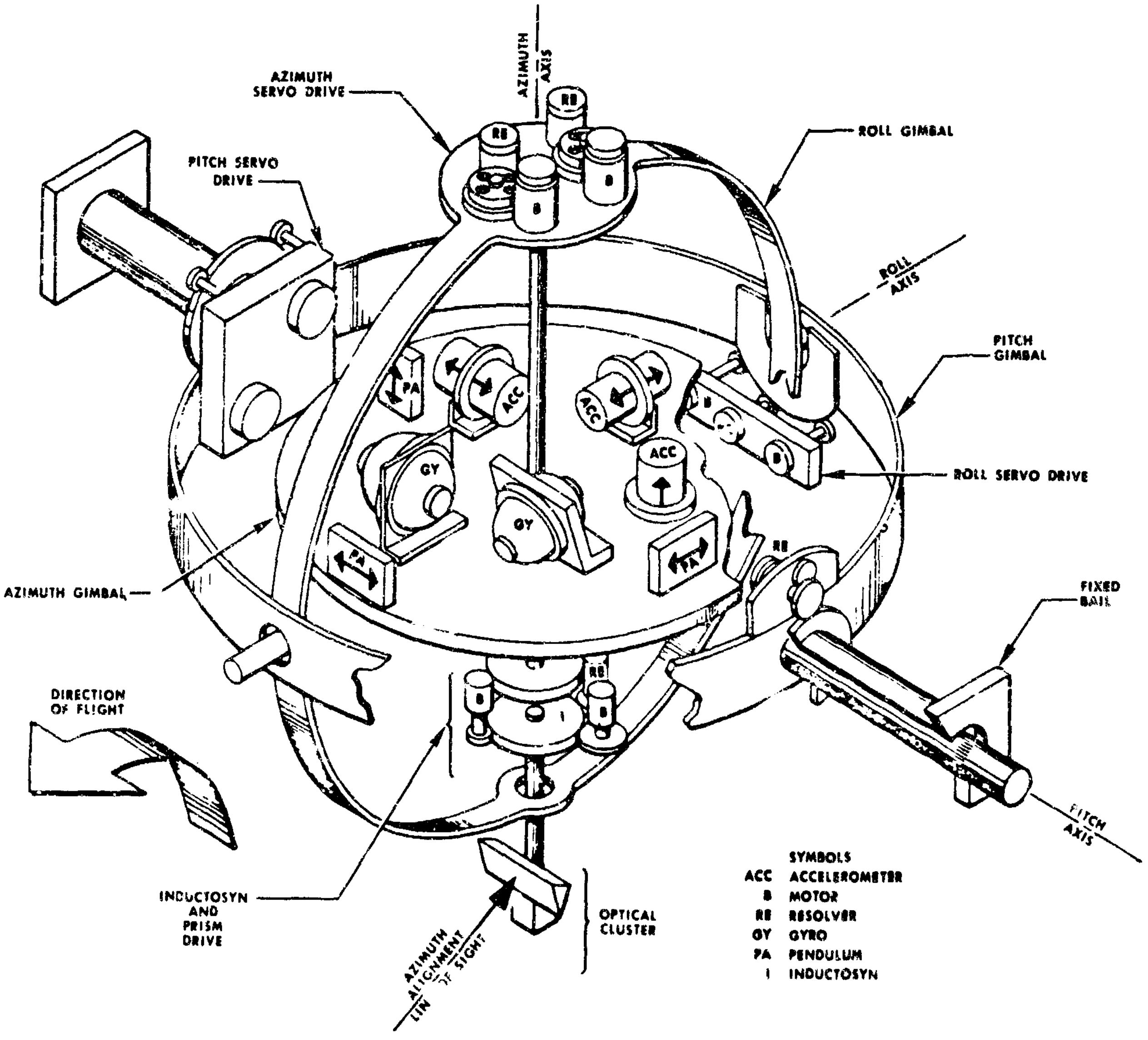
CONVAIR PROPELLANT LOADING/UTILIZATION SYSTEM



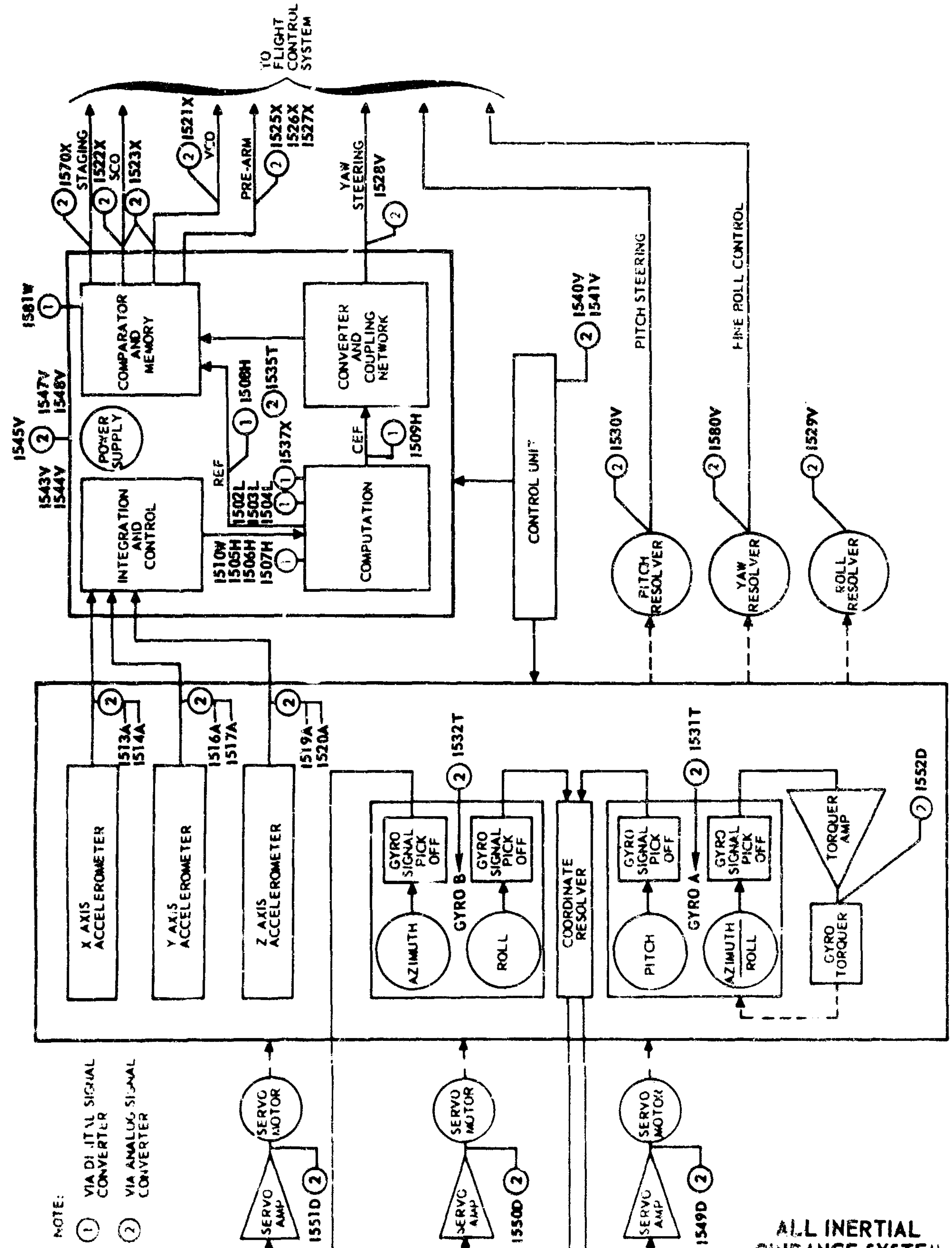
LO$_2$ SUBCOOLED SLUG TRANSFER UNIT



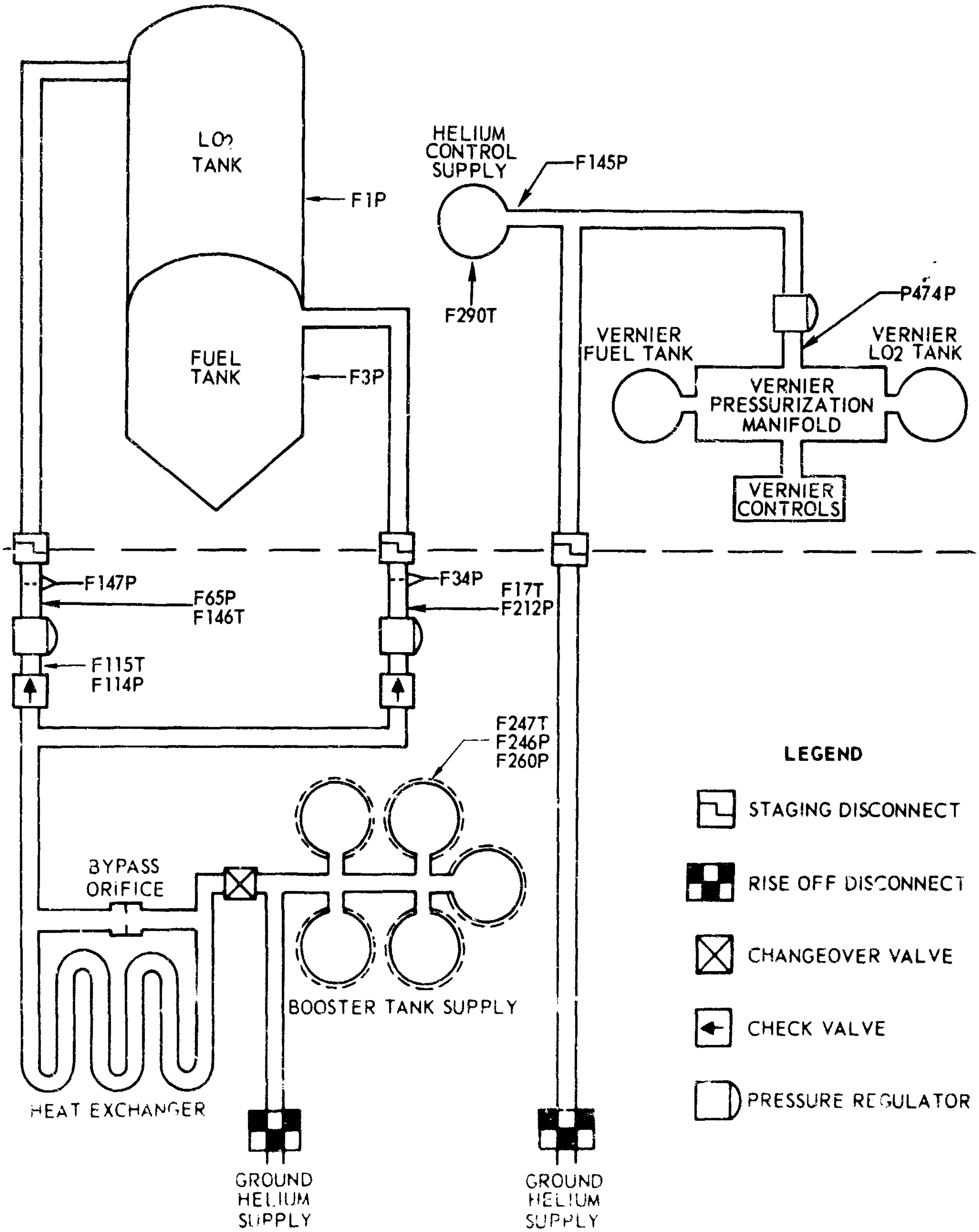
FLIGHT CONTROL SYSTEM



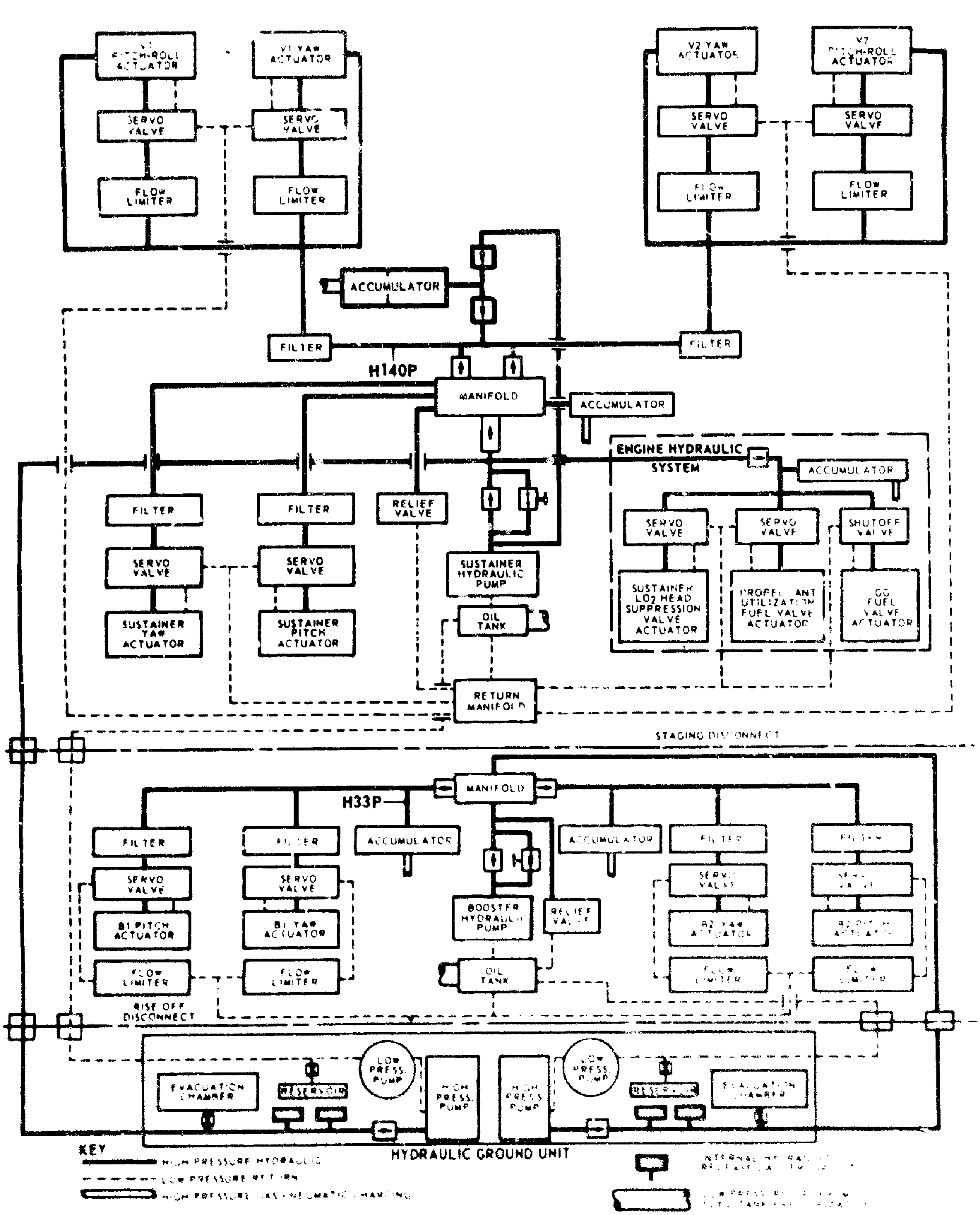
ALL INERTIAL GUIDANCE PLATFORM



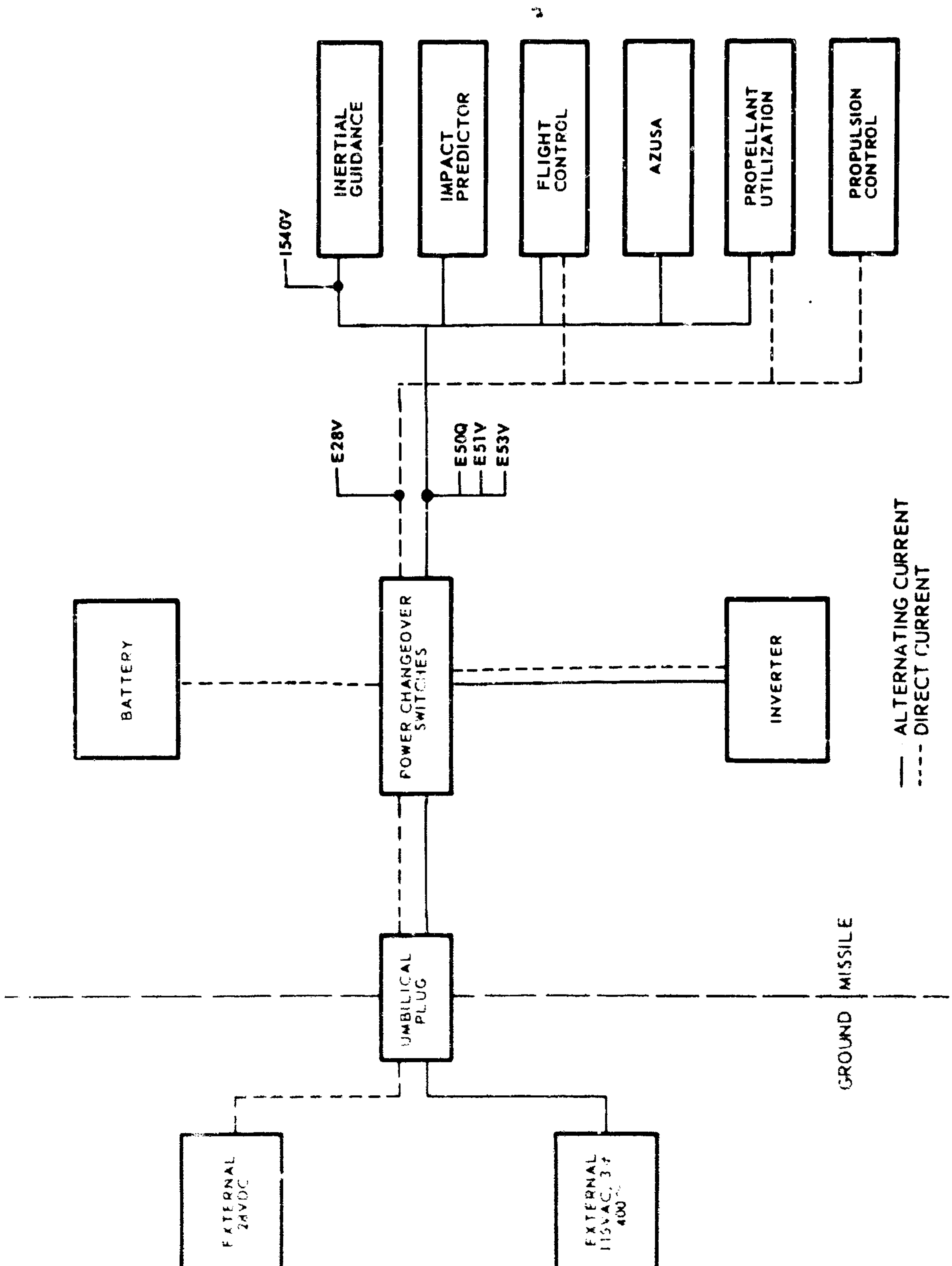
ALL INERTIAL GUIDANCE SYSTEM



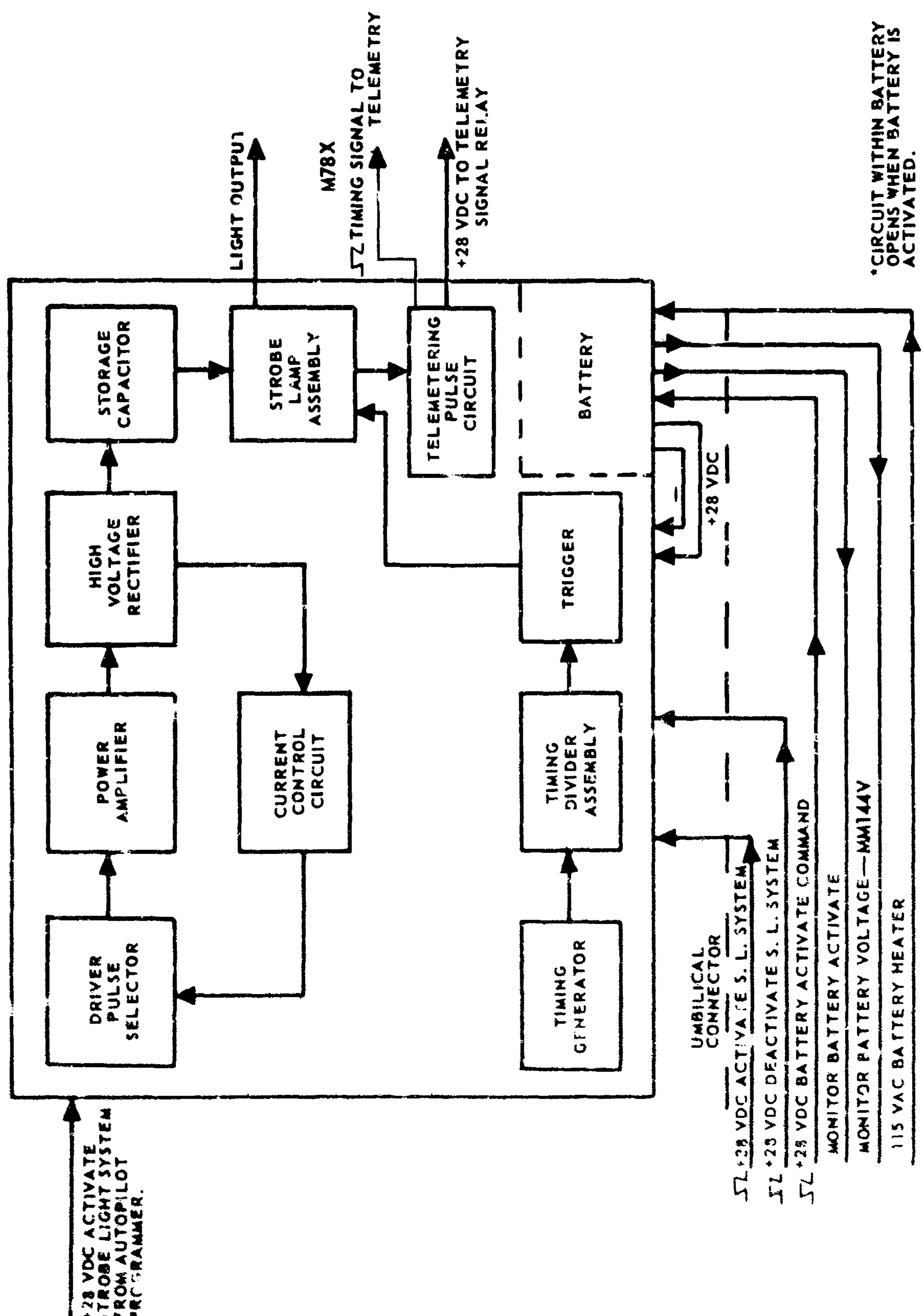
AIRBORNE PNEUMATICS SYSTEM



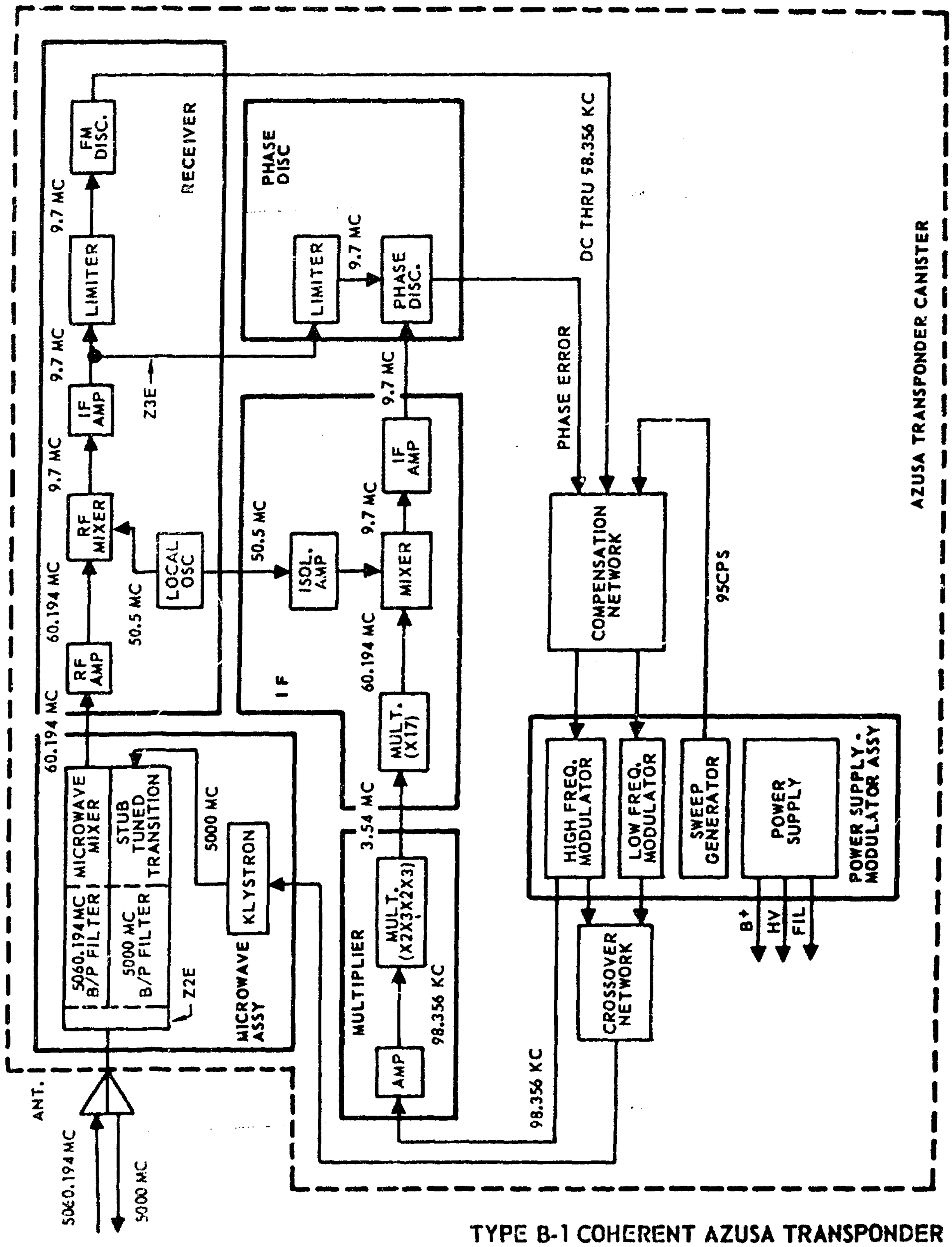
HYDRAULIC SYSTEM



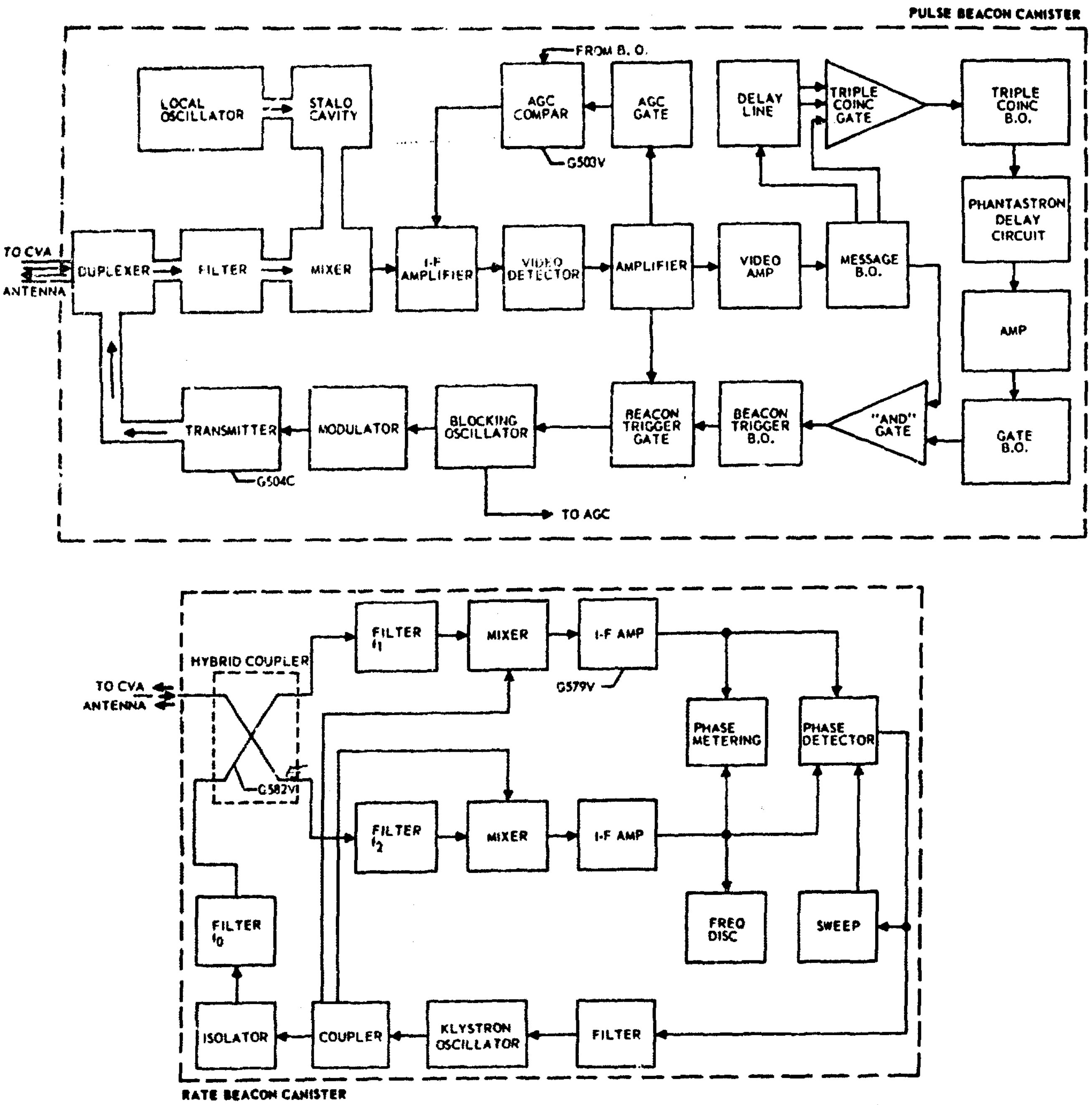
ELECTRICAL SYSTEM



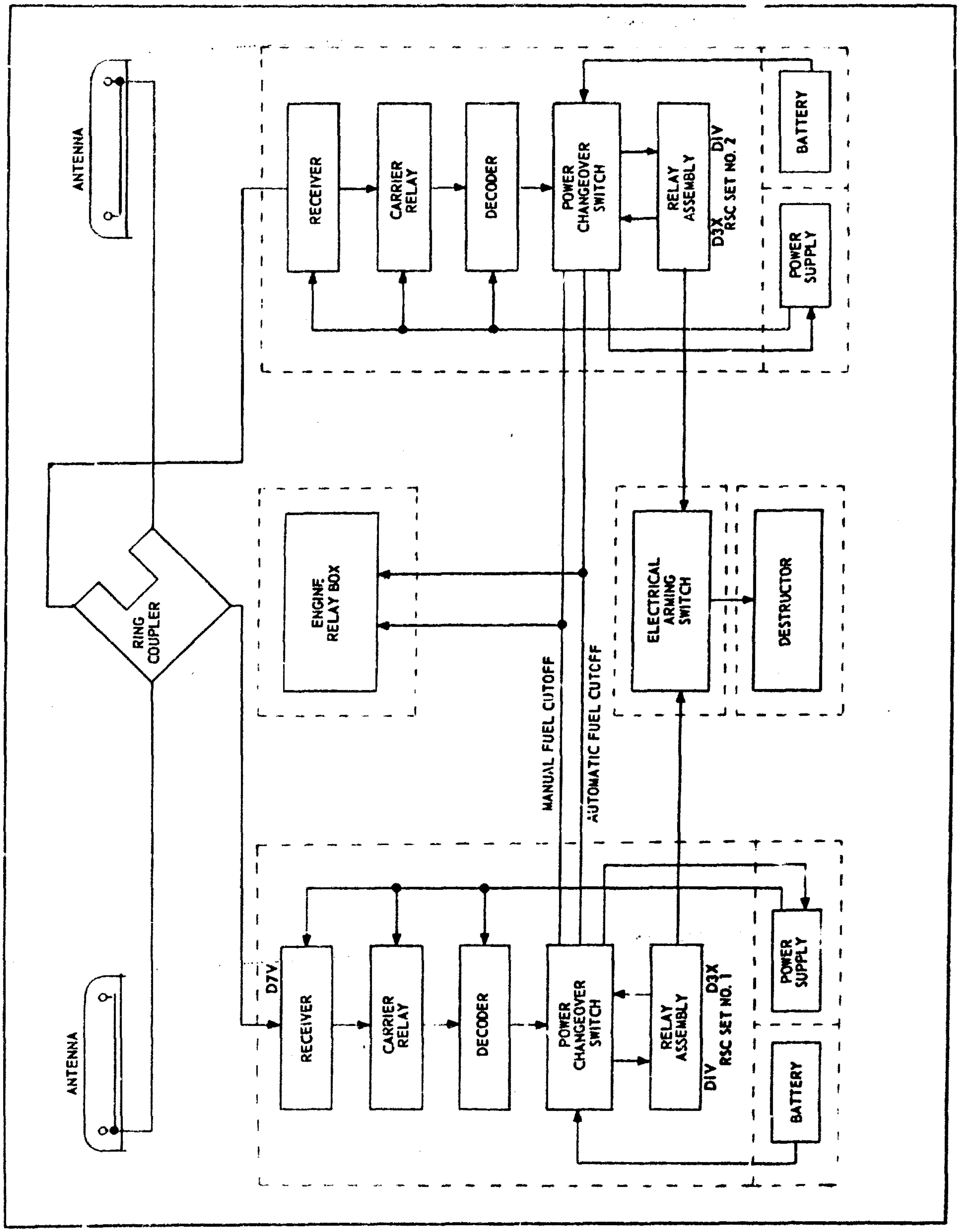
STROBE LIGHT SYSTEM



TYPE B-1 COHERENT AZUSA TRANSPONDER

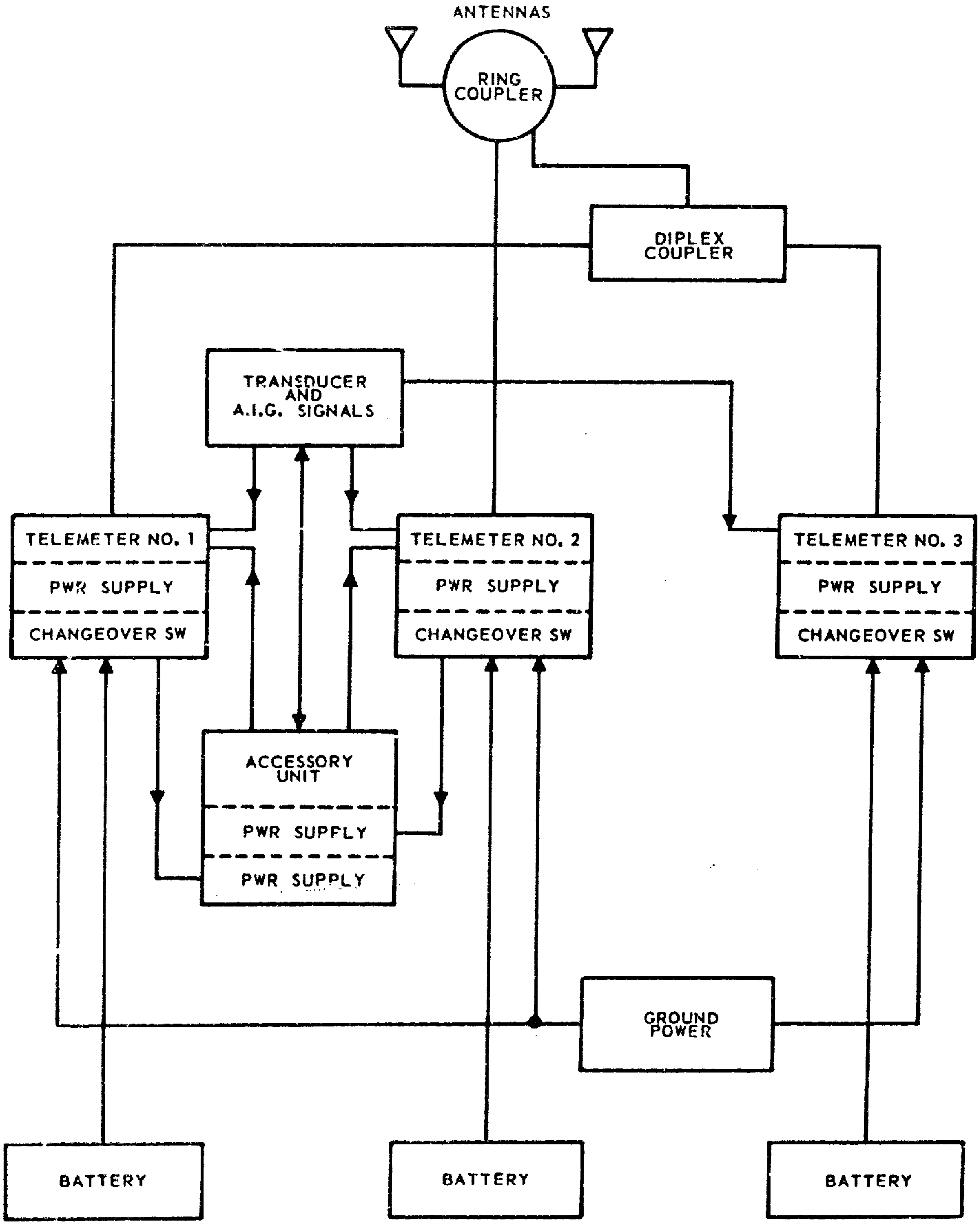


MOD III TRAJECTORY INSTRUMENTATION SYSTEM



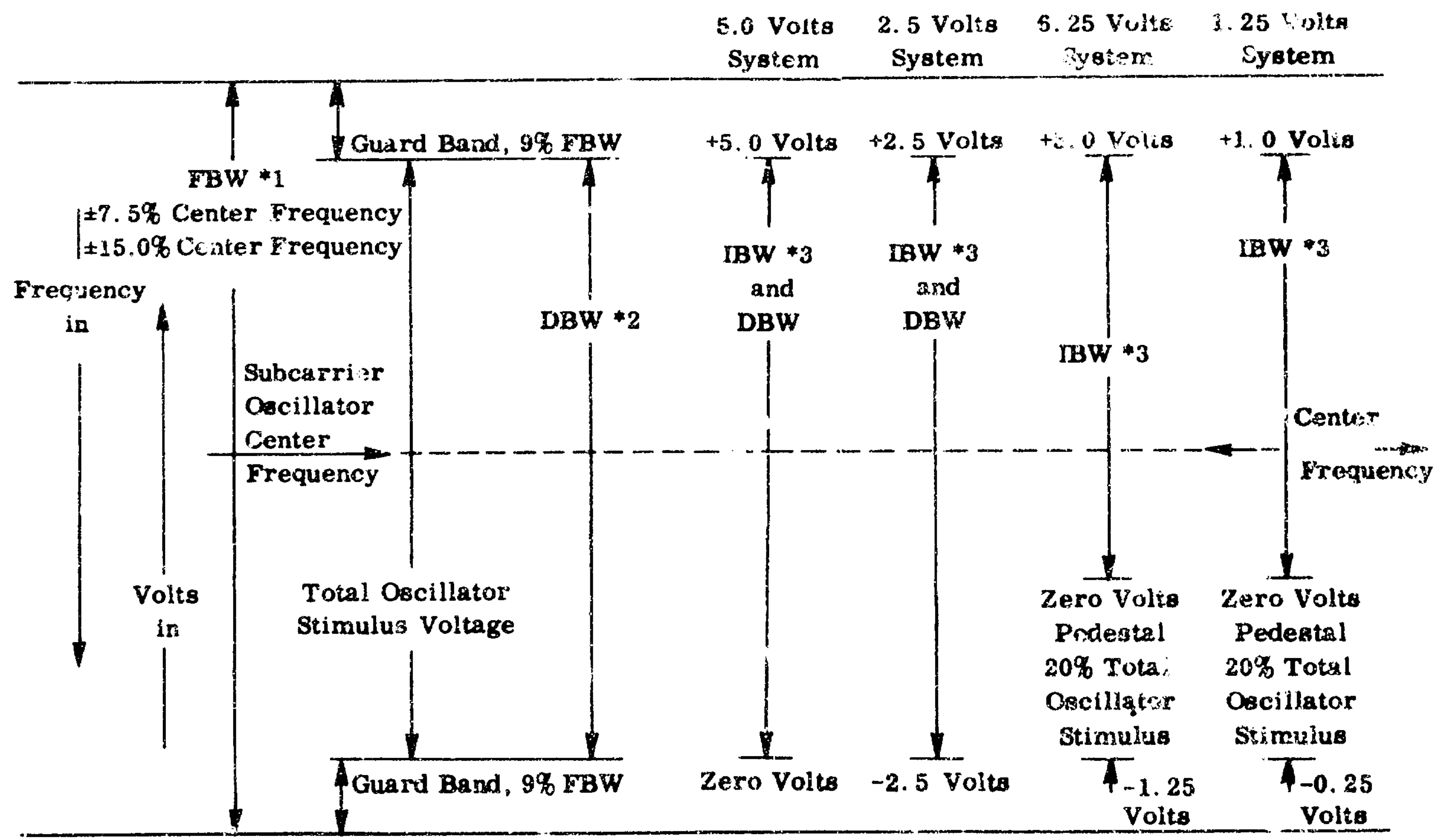
RANGE SAFETY COMMAND SYSTEM

CONVAIR-ASTRONAUTICS



TELEMETRY SYSTEM - E/R & D

Pictorial explanation of Bandwidth terminology showing typical subcarrier oscillator characteristics



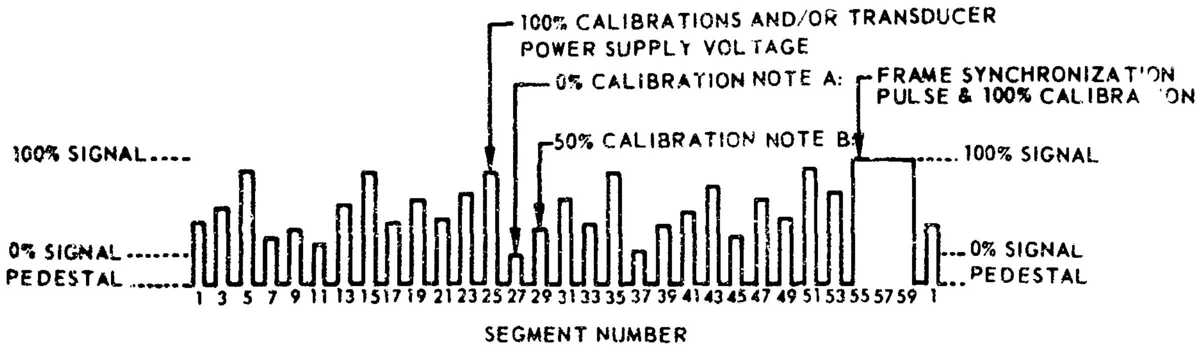
1. Full Bandwidth extends above and below fc by 7.5% fc for the numbered channels and 15% fc for the lettered channels.

2. Design Bandwidth equals 82% FBW.

3. Information Bandwidth equals any continuous 80% DBW when a pedestal voltage is used. If a pedestal voltage is not used, IBW equals DBW.

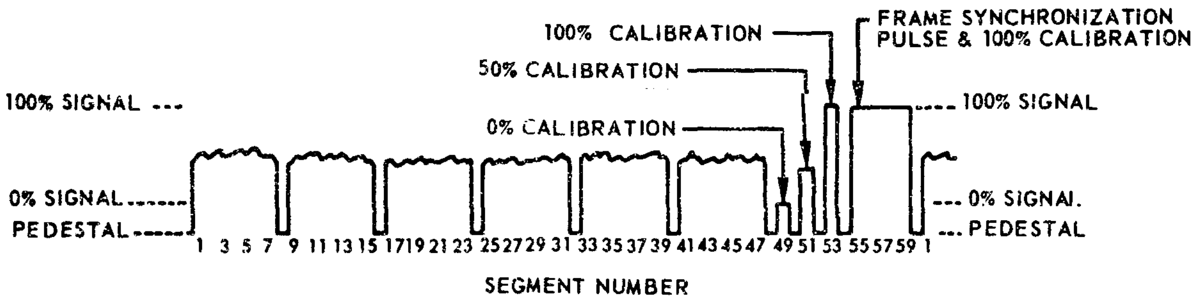
BANDWIDTH TERMINOLOGY

2.5, 5, 10 & 30 RPS COMMUTATION RATES



EFFECTIVITY: TLM NO. 1 CHANNELS 11, 12, 13 & A
TLM NO. 2 CHANNEL 11E

COMMUTATION WAVEFORM
1/8 RPS COMMUTATION RATE
HIGH FREQUENCY VIBRATION MEASUREMENTS



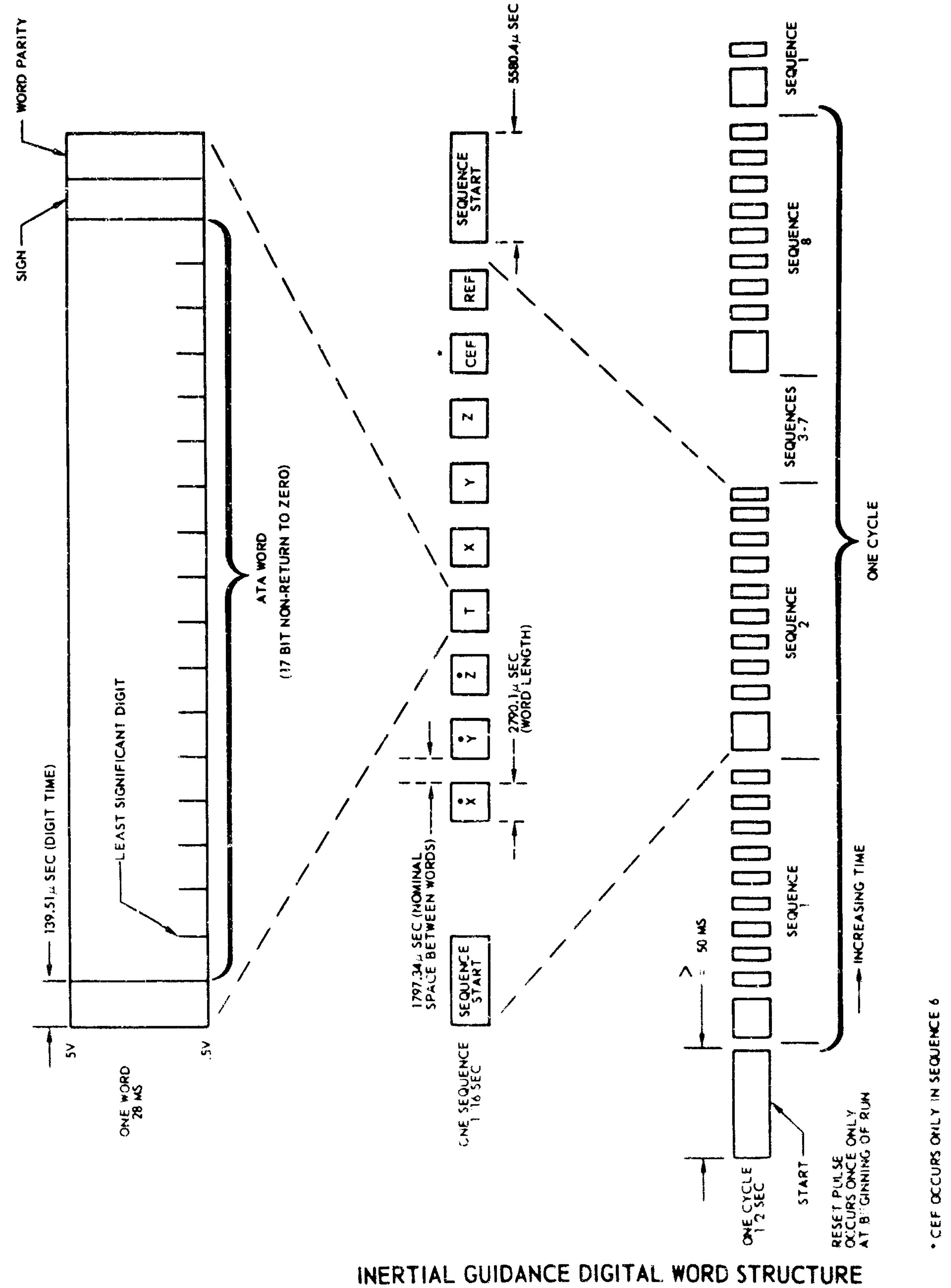
EFFECTIVITY: TLM #1 CHANNEL C

NOTE A: 1. FOR VOLTAGE AND PRESSURE MEASUREMENTS 0% CALIBRATION IS MISSILE GROUND
2. FOR TEMPERATURE MEASUREMENTS 0% CALIBRATION IS 500 OHMS ABOVE MISSILE GROUND.

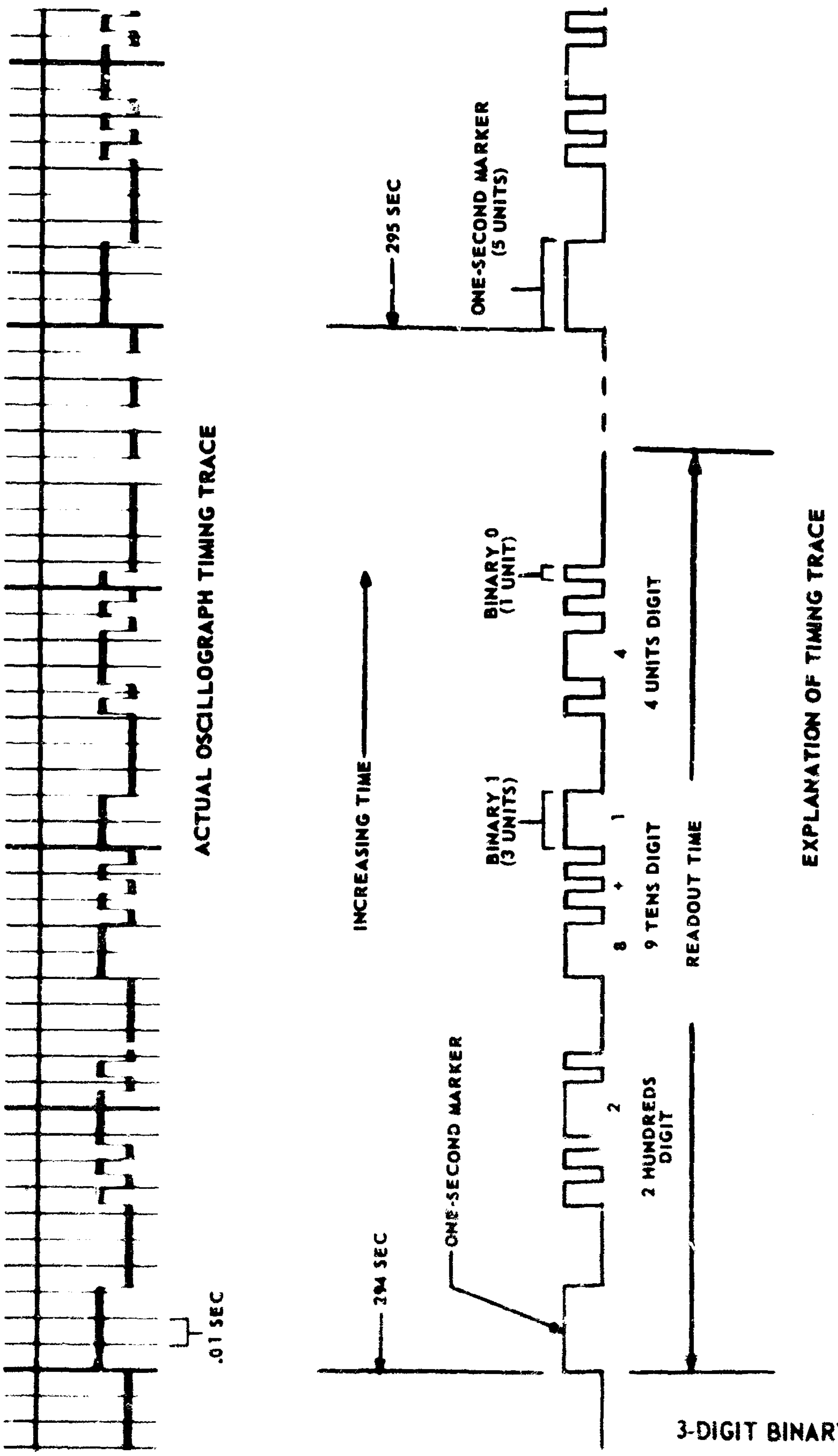
NOTE B: ON TLM NO. 1 CHANNEL 11 AND TLM NO. 3 CHANNEL 11 PIN 29 IS VOLTAGE 0% CALIBRATION.

NOTE C: TELEMETER 1, CHANNEL E IS A DIGITAL CHANNEL.

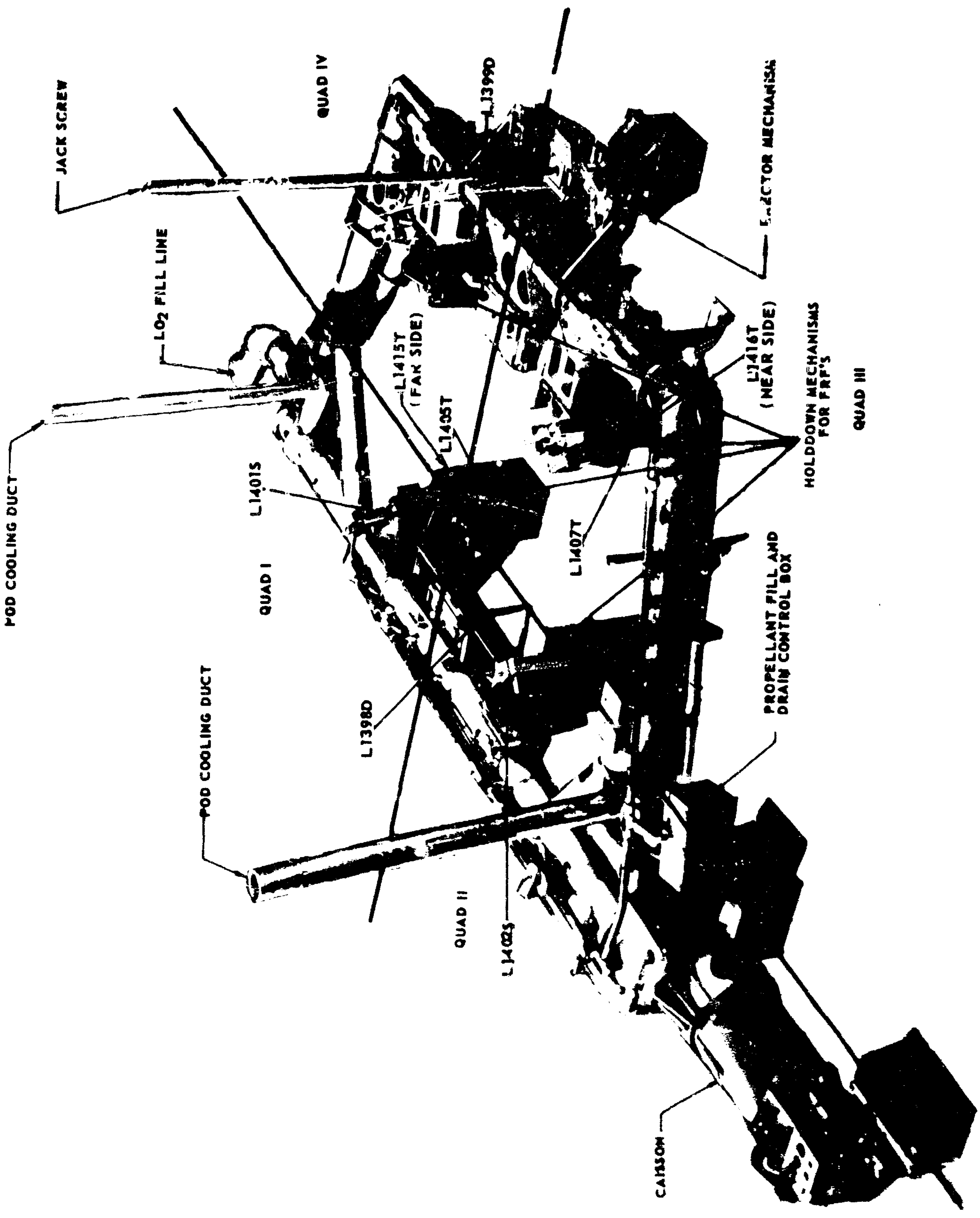
COMMUTATED WAVE FORMS - E/R&D



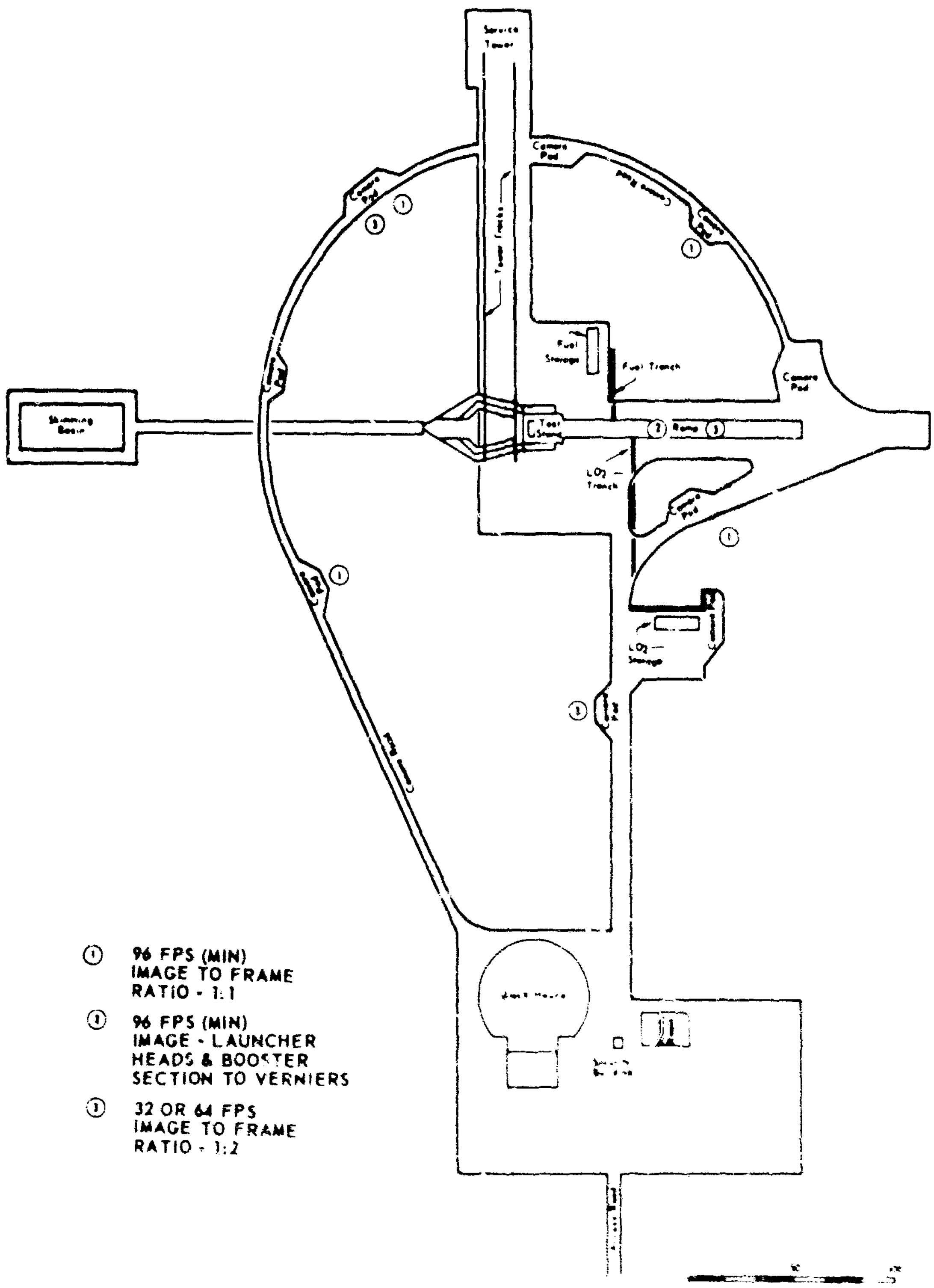
INERTIAL GUIDANCE DIGITAL WORD STRUCTURE



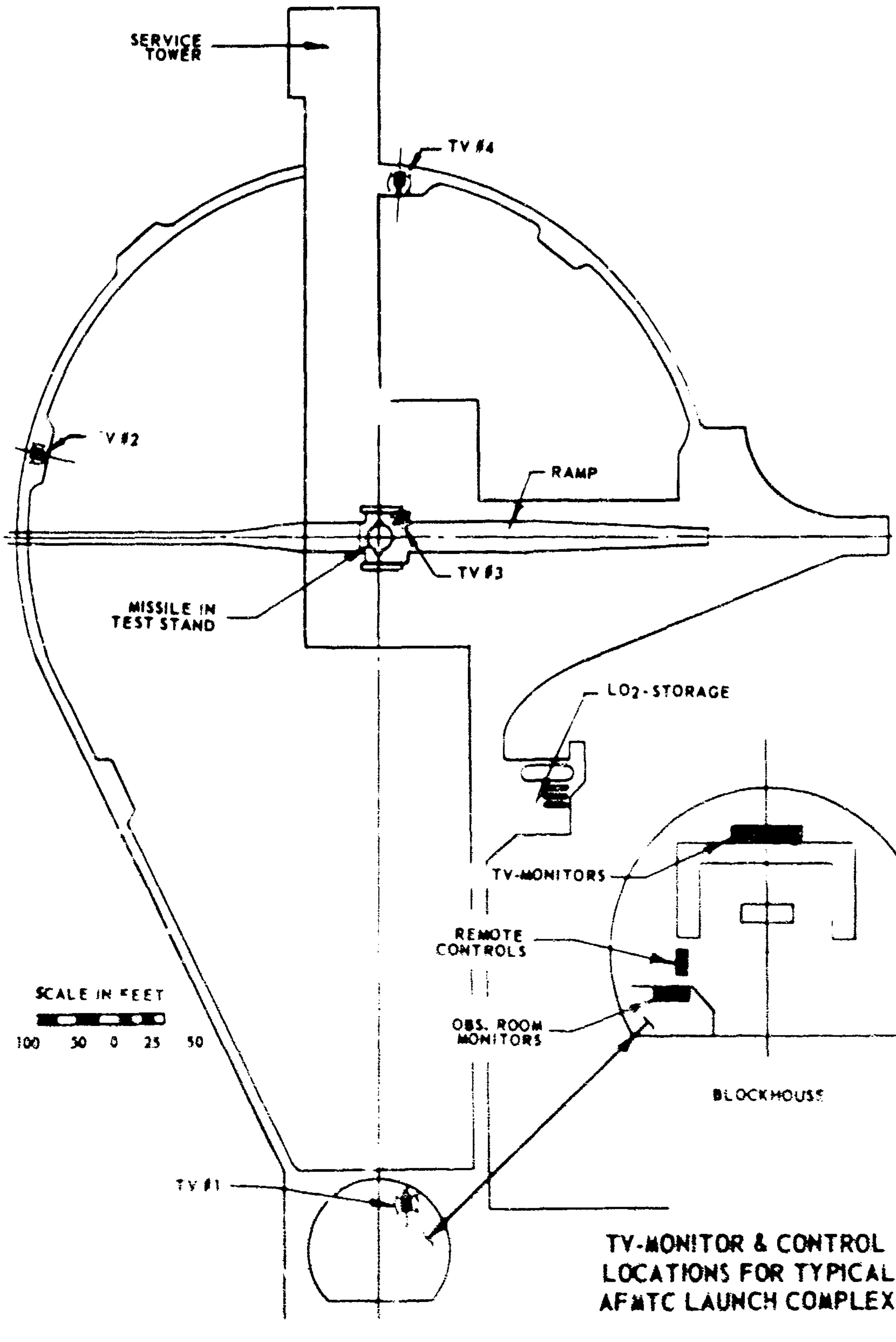
3-DIGIT BINARY TIMING CODE



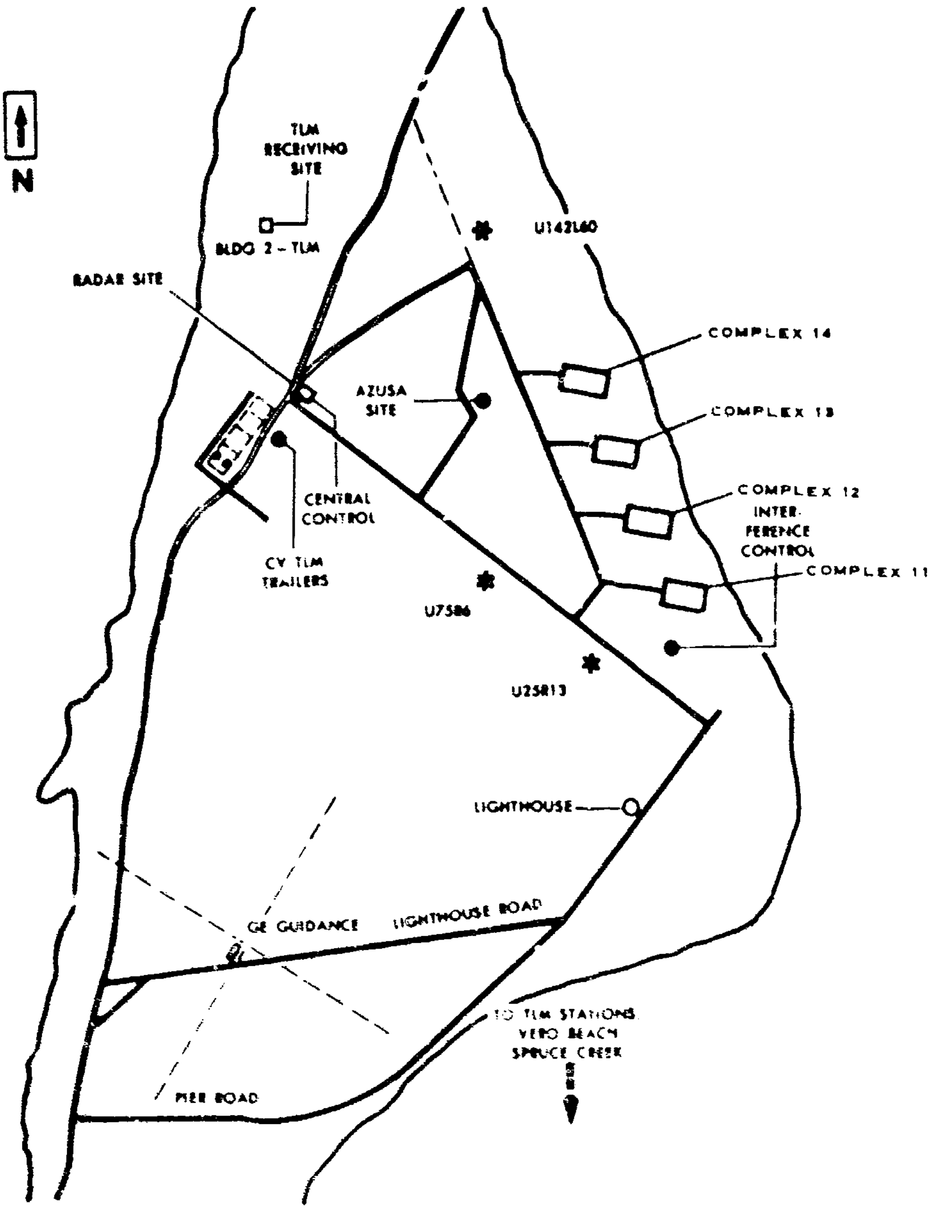
LAUNCHER INSTRUMENTATION



TYPICAL WS 107A-1 LAUNCH COMPLEX
MINIMUM ENGINEERING
CAMERA COVERAGE

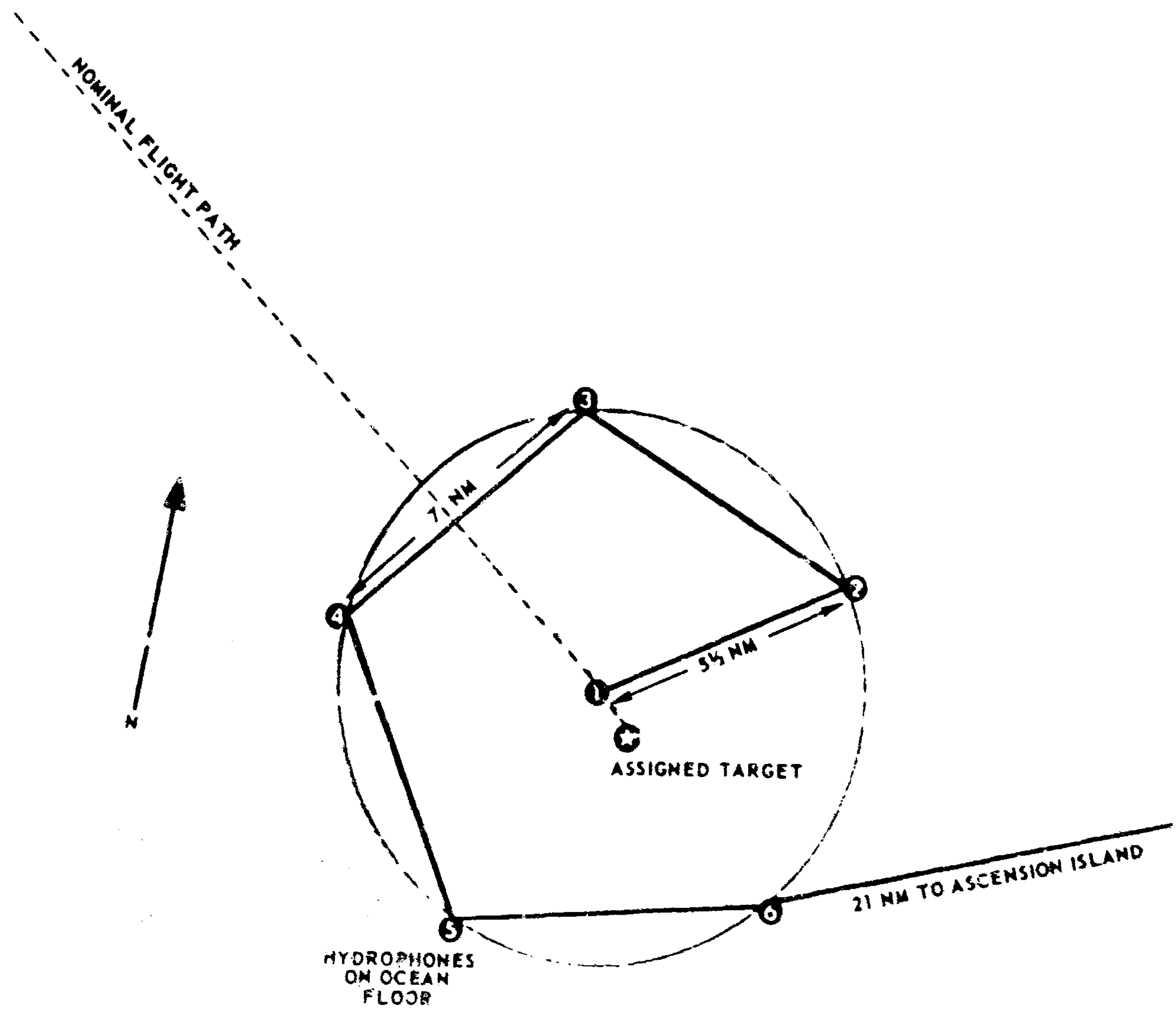


TV-MONITOR & CONTROL LOCATIONS FOR TYPICAL AFMTC LAUNCH COMPLEX

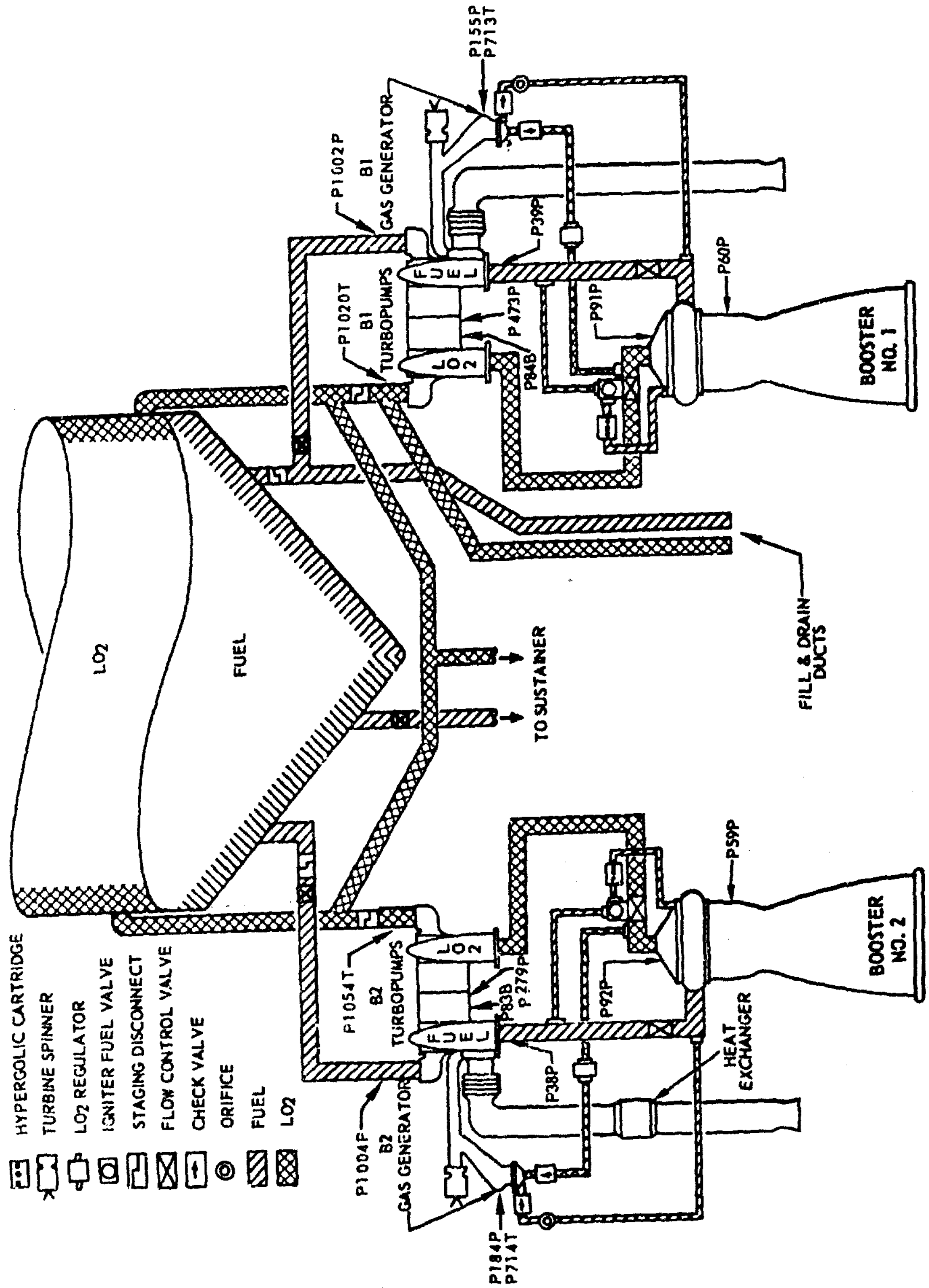


* TYPICAL CAMERA LOCATION
MINIMUM FRAME RATE 32 FPS
IMAGE TO FRAME RATIO PRIOR
TO LIFT-OFF 1:2

TYPICAL TRACKING CAMERA COVERAGE
(MINIMUM ENGINEERING REQUIREMENTS)

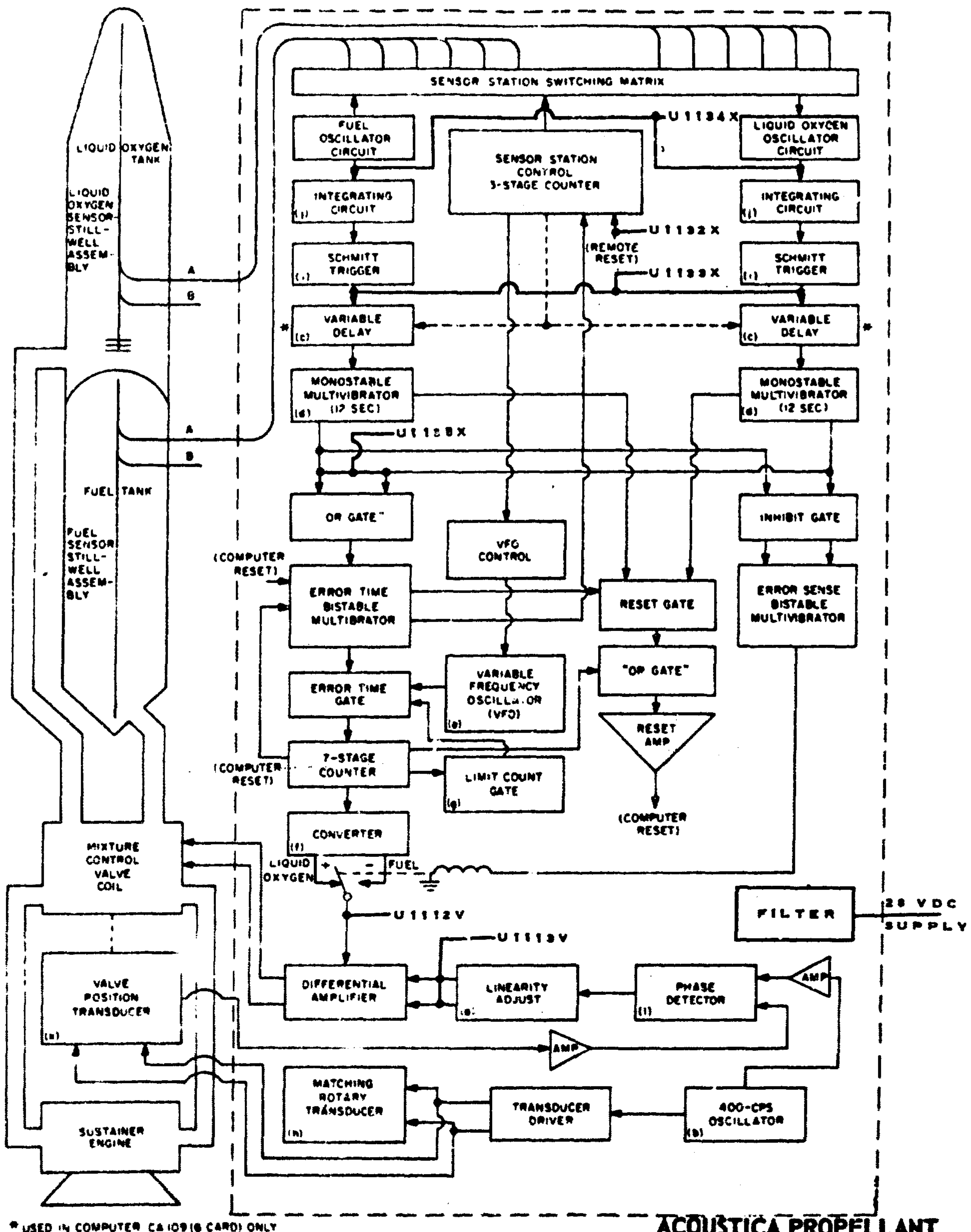


ASCENSION ISLAND
SPLASH NET (MILS)
INSTRUMENTATION

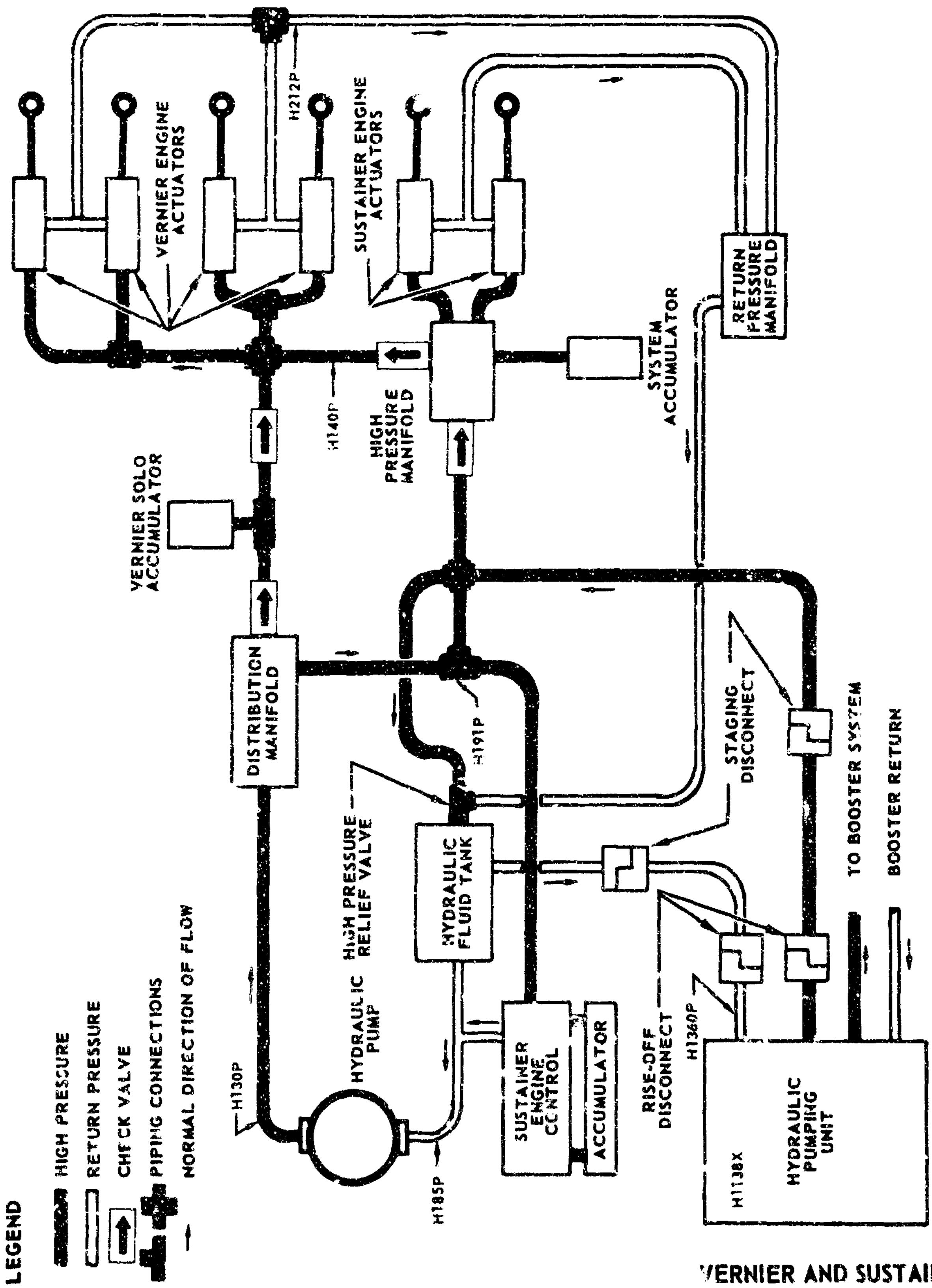


BOOSTER ENGINES

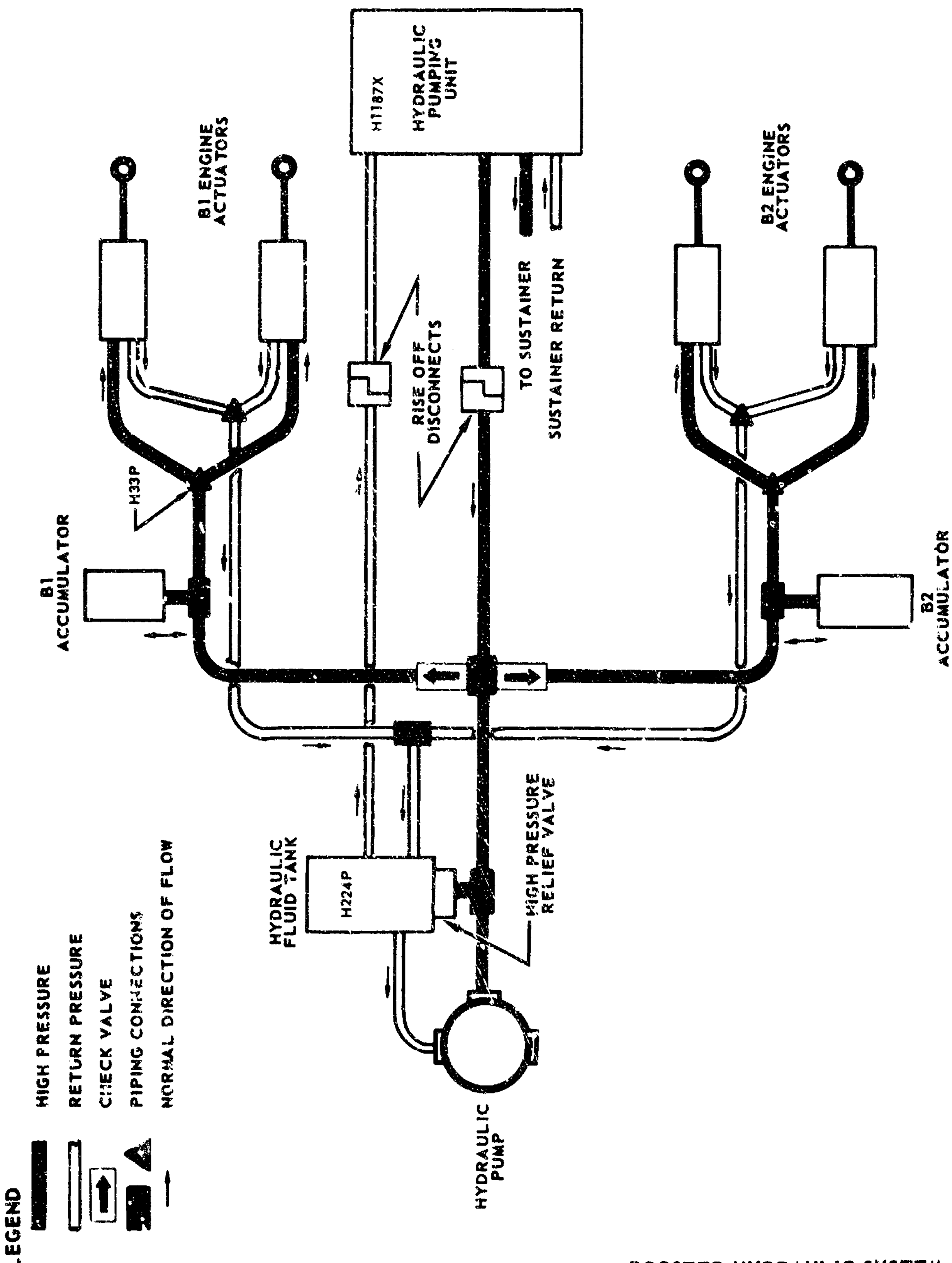
CONFIDENTIAL



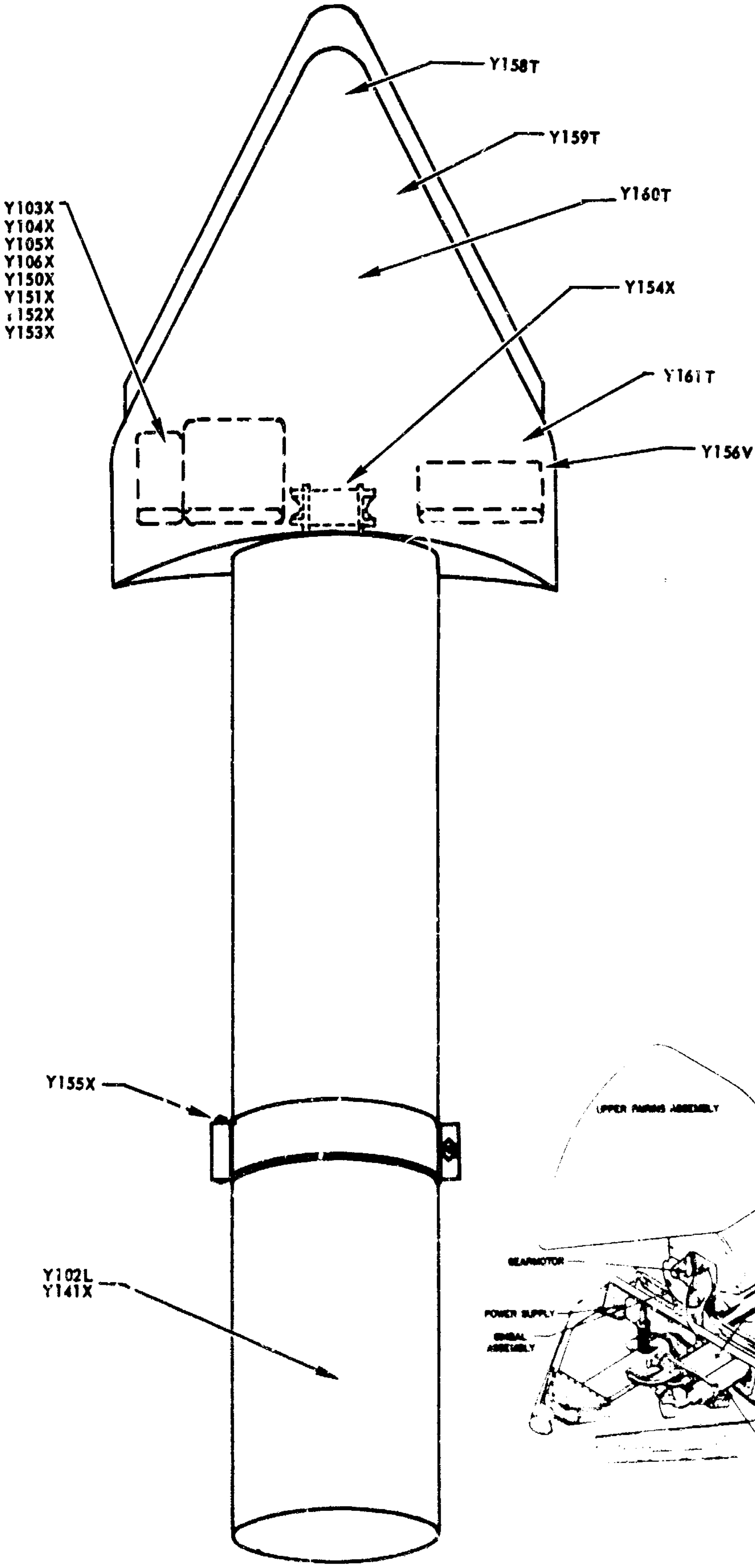
ACOUSTICA PROPELLANT UTILIZATION SUBSYSTEM BLOCK DIAGRAM

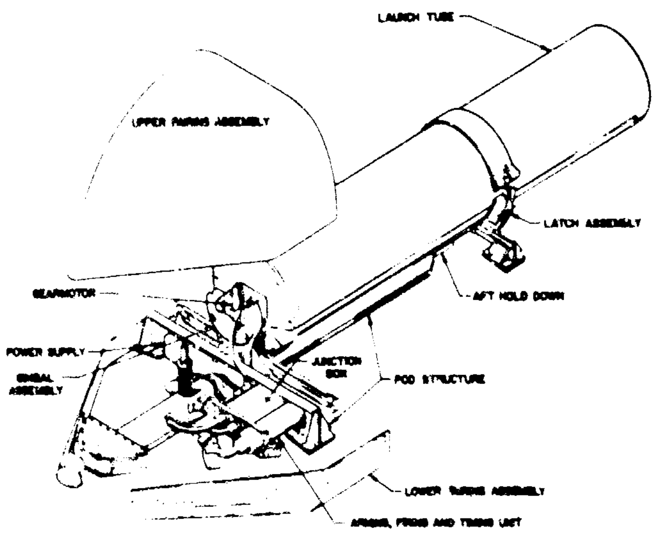


VERNIER AND SUSTAINER HYDRAULIC SYSTEM



BOOSTER HYDRAULIC SYSTEM





DECOY POD - MOD I

SECTION 8

E FLIGHT INSTRUMENTATION COMPOSITE

The Missile Composite presented in this section contains the instrumentation planned at the time of publication of this report for the E Flight program. This tabulation is sorted by measurement system.

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated description of the measurement.

MISSILE ALLOCATIONS

These numbers are the "E" Series number of each of the E Flight missiles shown.

EID NUMBERS

Each type of missile has an "END ITEM DESCRIPTION" number. Within that type, the missiles are numbered consecutively.

VEHICLE SERIES

					3	4	8	9	12	13	16	17
				27				FLIGHT				
				0011	1	2	3	4	5	6	7	8
E	F	M116	P	DIFFERENTIAL PRESS	M	M	M	M	M	M	M	M
E	F	125	P	B CTL PNEU REG OUT	OX	OX	OX	OX	OX	OX	OX	OX
E	F	194	P	FACILITY GN_2 SUPPLY	X	X	X	X	X	X	X	X
E	P	311	X	90% FUEL LVL IND	X	X	X	X	X	X	X	X
E	P	335	X	SGG VLV CLSD MSW	S	S	S	S	S	S	S	S
E	P	347	X	S COF RELAY LOCKIN	OS	OS	OS	OS	OS	OS	OS	OS

MEASUREMENT NUMBER

MEASUREMENT ALLOCATIONS

The letters under the missile numbers indicate the missiles on which the measurement is instrumented. Each letter indicates a different means of instrumentation. The letter "O" is Telemetry, "X" is Landline, "M" is a panel meter and the "S" indicates Standard Sequence measurements.

NOTE: For a more detailed explanation of this format and a key to the abbreviations and coding see Appendix A of this report.

MISSILE INSTRUMENTATION COMPOSITE

REPORT NO. L-R&D COMPOSITE DATE 15 MAY 61 PAGE 001

Vehicle	System	Measurement Number	Type Measurement	Description	TLM / Sec	Unicamber / Track	Comm Pin / Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	4/2	8/3	9/4	12/5	13/6	16/7	17/8	18/9	21/10	22/11	25/12	26/13	30/14	32/15	35/16	36/17	40/19	
	A	285	I	THRUST SECT LITE B1	3	11	1	0	600	FTC			X	X	X	X														947
	A	744	I	THRUST SECT LITE B2	3	11	3	0	600	FTC			X	X	X	X														715
	A	781	O	BASE LOX TK P REG RD	1	C	1	M30	30	G	5%	12C								X	X			X				X		1836
	A	781	O	CROSS CONNECT THRU	1	C	7													X	X			X				X		1836
	A	782	O	BASE LOX TK P REG LG	1	C	9	M30	30	G	5%	12C								X	X			X				X		1836
	A	782	O	CROSS CONNECT THRU	1	C	15													X	X			X				X		1836
	A	783	O	BASE LOX TK P REG TG	1	C	17	M30	30	G	5%	12C								X	X			X				X		1836
	A	783	O	CROSS CONNECT THRU	1	C	23													X	X			X				X		1836
	A	784	O	LOX TK P REG RADIAL	1	C	25	M30	[illegible]	G	5%	12C												X				X		1836
	A	784	O	CROSS CONNECT THRU	1	C	31																	X				X		1836
	A	785	O	LOX TK P REG TANG	1	C	33	M30	30	G	5%	12C												X				X		1836
	A	785	O	CROSS CONNECT THRU	1	C	39																	X				X		1836
	A	786	O	BASE F TK P REG RAD	1	C	1	M30	30	G	5%	12C										X	X			X	X			1447
	A	786	O	CROSS CONNECT THRU	1	C	7															X	X			X	X			1447
	A	787	O	BASE F TK P REG LONG	1	C	9	M30	30	G	5%	12C										X	X			X	X			1447
	A	787	O	CROSS CONNECT THRU	1	C	15															X	X			X	X			1447
	A	788	O	BASE F TK P REG TANG	1	C	17	M30	30	G	5%	12C										X	X			X	X			1447
	A	788	O	CROSS CONNECT THRU	1	C	23															X	X			X	X			1447
	A	789	O	FUEL TK P REG RAD	1	C	25	M30	30	G	5%	12C														X	X			1447
	A	789	O	CROSS CONNECT THRU	1	C	31																			X	X			1447
	A	790	O	FUEL TK P REG TANG	1	C	33	M30	30	G	5%	12C														X	X			1447
	A	790	O	CROSS CONNECT THRU	1	C	39																			X	X			1447
	A	862	O	B2 PUMP UNIT Y AXIS	3	6		M30	30	G	3%	30	X																	1539
	A	863	O	B2 PUMP UNIT Z AXIS	2	12		M30	30	G	3%	30	X																	1539
	A	925	O	LOX TK P REG RADIAL	1	C	25	M30	30	G	5%	12C								X	X									1447
	A	925	O	CROSS CONNECT THRU	1	C	31													X	X									1447
	A	926	O	LOX TK P REG TANG	1	C	33	M30	30	G	5%	12C								X	X									1447
	A	926	O	CROSS CONNECT THRU	1	C	39													X	X									1447
	A	930	O	FUEL TK P REG RADIAL	1	C	25	M30	30	G	5%	12C										X	X							1447
	A	930	O	CROSS CONNECT THRU	1	C	31															X	X							1447

CONFIDENTIAL

REPORT NO. R-R&D COMPOSITE DATE 15 MAY 61 PAGE 002

Vehicle	System	Measurement Number	Type Measurement	Description	TLM/SEC	Subcarrier/Track	Comm Pin/Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	4/2	8/3	9/4	12/5	13/6	16/7	17/8	18/9	21/10	22/11	25/12	26/13	30/14	32/15	35/16	36/17	40/19	
	A	931	O	FUEL TK P REG TANG	1	C	33	M30	30	G	5%	12C										X	X							1447
	A	931	O	CROSS CONNECT THRU	1	C	39															X	X							1447
	A	945	O	B2 GIMBAL BLOCK Y AX	2	13		M50	50	G	3%	30	X																	1539
	A	946	O	B2 YAW ACT TIE PT	3	12		M50	50	G	3%	30	X																	1539
	A	5	P	V2 CLAMSHELL INNER	1	13	13	0	15	PIA	5%	SLO			X															1672
	A	5	P	V2 CLAMSHELL INNER	2	11	49	0	15	PIA	5%	SLO				X														1717
	A	18	P	DUMMY ROD HYD PR	1	A	15	0	3500	PIA	5%	SLO				X														1730
	A	1	T	V2 FAIRING AMBIENT	3	11	23	0	1000	DGF	5%	SLO			X	X	X													1717
	A	2	T	V2 CLAMSHELL AMB	3	11	3	0	1000	DGF	5%	SLO									X	X								1810
	A	2	T	V2 CLAMSHELL AMB	3	11	31	0	1000	DGF	5%	SLO			●	●	●													1717
	A	2	T	V2 CLAMSHELL AMB	3	11	53	0	1000	DGF	5%	SLO							X											1810
	A	3	T	V2 CONDUIT	3	11	33	0	1000	DGF	5%	SLO			●	●	●													1717
	A	4	T	V2 SERVO ELEC CON	3	11	39	0	1000	DGF	5%	SLO			●	●	●													1717
	A	6	T	ROD PANEL AMBIENT	3	11	53	0	1000	DGF	5%	SLO			X	X														1717
	A	7	T	DUMMY ROD INNER A	3	11	47	0	1000	DGF	5%	SLO			X															1672
	A	8	T	DUMMY ROD INNER B	3	11	49	0	1000	DGF	5%	SLO			X															1672
	A	9	T	DUMMY ROD OBRD NUT	3	11	51	0	1000	DGF	5%	SLO			X															1672
	A	16	T	DUMMY ROD OUTER A	3	11	35	0	1000	DGF	5%	SLO				X														1730
	A	17	T	DUMMY ROD OUTER B	3	11	37	0	1000	DGF	5%	SLO				X														1730
	A	19	T	V-2 FAIRING AMBIENT2	3	11	1	0	1000	DGF	5%	SLO									X	X								1810
	A	19	T	V2 FAIRING AMBIENT 2	3	11	51	0	1000	DGF	5%	SLO				X	X		X											1810
	A	20	T	V-2 CLAMSHELL COMPNT	3	10	53	0	500	DGF	4%	SLO							X		X	X								1810
	A	21	T	V-2 FAIRING COMPONET	3	11	11	0	500	DGF	4%	SLO										X								1810
	A	21	T	V-2 FAIRING COMPONET	3	11	41	0	500	DGF	4%	SLO							X											1810
	A	21	T	V-2 FAIRING COMPONET	3	10	3	0	500	DGF	4%	SLO									X									1810
	A	41	T	MISSILE TK NR PB POD	3	11	11	AMB	540	DGF	4%	SLO									X		X	X						1810
	A	41	T	MISSILE TK NR PB POD	3	10	7	AMB	540	DGF	4%	SLO								X										1810
	A	42	T	MISSILE TK NR PB POD	3	11	13	AMB	540	DGF	4%	SLO									X		X	X						1810
	A	42	T	MISSILE TK NR PB POD	3	10	9	AMB	540	DGF	4%	SLO								X										1810
	A	43	T	MISSILE TK NR PB POD	3	11	15	AMB	540	DGF	4%	SLO									X		X	X						1810
	A	43	T	MISSILE TK NR PB POD	3	10	13	AMB	540	DGF	4%	SLO								X										1810

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / RSC	SUBCARRIER / TRACK	COMM POS / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	6 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	A	44	T	MISSILE TK NR PB POD	3	11	1	AMB	540	DGF	4%	SLO											X	X						1810
	A	44	T	MISSILE TK NR PB POD	3	10	5	AMB	540	DGF	4%	SLO									X									1810
	A	44	T	MISSILE TK NR PB POD	3	10	43	AMB	540	DGF	4%	SLO								X										1810
	A	45	T	MISSILE TK NR PB POD	3	11	3	AMB	540	DGF	4%	SLO											X	X						1810
	A	45	T	MISSILE TK NR PB POD	3	11	53	AMB	540	DGF	4%	SLO									X									1810
	A	45	T	MISSILE TK NR PB POD	3	10	45	AMB	540	DGF	4%	SLO								X										1810
	A	46	T	MISSILE TK NR ADF	3	11	17	0	1000	DGF	4%	SLO									X							X		1811
	A	46	T	MISSILE TK NR ADF	3	10	5	0	1000	DGF	4%	SLO								X										1811
	A	47	T	MISSILE TK NR ADF	3	11	19	0	1000	DGF	4%	SLO									X							X		1811
	A	47	T	MISSILE TK NR ADF	3	10	11	0	1000	DGF	4%	SLO								X										1811
	A	48	T	MISSILE TK NR ADF	3	11	43	0	1000	DGF	4%	SLO									X							X		1811
	A	48	T	MISSILE TK NR ADF	3	10	3	0	1000	DGF	4%	SLO								X										1811
	A	49	T	MISSILE TK NR ADF	3	11	45	0	1000	DGF	4%	SLO									X							X		1811
	A	49	T	MISSILE TK NR ADF	3	10	41	0	1000	DGF	4%	SLO								X										1811
	A	51	T	MISSILE TK NR AFSWC	3	11	21	0	500	DGF	4%	SLO									X		X	X						1824
	A	52	T	MISSILE TK NR AFSWC	3	11	23	0	500	DGF	4%	SLO									X		X	X						1822
	A	53	T	MISSILE TK NR AFSWC	3	11	47	0	500	DGF	4%	SLO									X		X	X						1822
	A	54	T	MISSILE TK NR AFSWC	3	11	49	0	500	DGF	4%	SLO									X		X	X						1822
	A	55	T	MISSILE TK NR AFSWC	3	11	51	0	500	DGF	4%	SLO									X		X	X						1822
	A	282	T	LO2 FWD BLKHD Q1	1	11	45	150	800	DGR	4%	SLO								X	X	X	X							1660
	A	294	T	LO2 FWD BLKHD Q3	1	11	41	150	800	DGR	4%	SLO								X	X	X	X							1660
	A	409	T	BLACK CALOR QUAD 1	3	11	11	0	1000	DGF	4%	SLO		X	X															1637
	A	409	T	BLACK CALOR QUAD 1	3	11	13	0	1000	DGF	4%	SLO				X														1734
	A	409	T	BLACK CALOR QUAD 1	3	10	5	0	1000	DGF	4%	SLO						X	X											862
	A	412	T	BLACK CALOR QUAD 4	3	11	13	0	1000	DGF	4%	SLO		X	X		X													1734
	A	412	T	BLACK CALOR QUAD 4	3	10	7	0	1000	DGF	4%	SLO						X	X											862
	A	438	T	38 GM CALOR QUAD 4	3	11	15	0	1000	DGF	4%	SLO		X	X		X													1734
	A	438	T	38 GM CALOR QUAD 4	3	10	9	0	1000	DGF	4%	SLO						X	X											862
	A	439	T	38 GM CALOR QUAD 1	3	11	17	0	1000	DGF	4%	SLO		X	X	X														1734
	A	439	T	38 GM CALOR QUAD 1	3	10	11	0	1000	DGF	4%	SLO						X	X											862
	A	440	T	19 GM CALOR QUAD 4	3	11	19	0	1000	DGF	4%	SLO		X	X		X													1734
	A	440	T	19 GM CALOR QUAD 4	3	10	13	0	1000	DGF	4%	SLO						X	X											862
	A	443	T	19 GM CALOR QUAD 1	3	11	21	0	1000	DGF	4%	SLO		X	X	X														1734

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / REC	SUBCARRIER / TRACK	COMM PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNIT OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	23 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	A	443	T	19 GM CALOR QUAD 1	3	10	3	0	1000	DGF	4%	SLO					X	X												862
	A	446	T	CABLEWY FRG COMP AMB	1	11	1	0	500	DGF	4%	SLO												X						1822
	A	446	T	CABLEWY FRG COMP AMB	3	10	5	0	500	DGF	4%	SLO									X	X								862
	A	452	T	B1 POD AMBIENT	3	10	7	0	500	DGF	4%	SLO								X	X	X								862
	~~A~~	~~455~~	~~T~~	~~B2 POD AMBIENT~~	~~3~~	~~10~~	~~1~~	~~0~~	~~500~~	~~DGF~~	~~4%~~	~~SLO~~								X	X	X								~~862~~
	A	458	T	AIG POD AMBIENT	3	11	49	500	1500	DGR	40	SLO					X	X	X											862
	A	461	T	V1 HEAT SHIELD	3	10	9	0	1000	DGF	4%	SLO								X	X	X								862
	A	464	T	THRST STRUCTURE SKIN	3	10	1	0	1000	DGF	4%	SLO					X	X	X											862
	A	467	T	B2 HAT SECTION INBRD	3	10	37	0	1000	DGF	4%	SLO					X	X	X											862
	A	470	T	B2 HAT SECTION OTBRD	3	10	17	0	1000	DGF	4%	SLO					X	X	X											862
	A	473	T	HEAT SHIELD OUTER	3	10	15	0	1000	DGF	4%	SLO					X	X	X											862
	A	476	T	HEAT SHIELD INNER	3	10	39	0	500	DGF	4%	SLO					X	X	X											862
	A	479	T	ADAPTER SECT AMBIENT	1	11	11	0	500	DGF	4%	SLO												X						1822
	A	479	T	ADAPTER SECT AMBIENT	3	10	3	0	500	DGF	4%	SLO									X	X								862
	A	486	T	AMB F STG VLV Q3	1	11	15	M100	300	DGF		SLO	X	X	X	X														998
	A	638	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X		998
	~~A~~	~~639~~	~~T~~	~~AMB JET RAIL Q4~~	~~1~~	~~11~~	~~45~~	~~M100~~	~~300~~	~~DGF~~		~~SLO~~	X	X	X	X														~~998~~
	~~A~~	~~640~~	~~T~~	~~FWD SIDE A FRAME Q4~~	~~1~~	~~11~~	~~21~~	~~M100~~	~~300~~	~~DGF~~	~~6%~~	~~SLO~~	X	X	X	X														~~998~~
	~~A~~	~~641~~	~~T~~	~~AMB F STG VLV Q1~~	~~1~~	~~11~~	~~37~~	~~M100~~	~~300~~	~~DGF~~		~~SLO~~	X	X	X	X														~~998~~
	A	642	T	AMB NEAR B2 GG Q3	1	11	41	M100	300	DGF		SLO			X	X														1023
	A	642	T	AMB NEAR B2 GG Q3	1	11	43	M100	300	DGF		SLO	X																	1023
	A	645	T	AMB FWD B1 Q4	1	11	33	M100	300	DGF	5%	SLO	X	X	X	X														1023
	A	666	T	ADAPT SKIN FWD	3	10	19	500	1800	DGR	52	SLO								X	X	X								862
	A	667	T	ADAPT SKIN CTR	3	10	21	500	1800	DGR	52	SLO								X	X	X								862
	A	668	T	ADAPT SKIN AFT	3	10	23	500	1800	DGR	52	SLO								X	X	X								862
	A	671	T	#3 FWD WRG-TBG FRG	3	10	31	500	1800	DGR	52	SLO								X	X	X								862
	A	674	T	FWD WRG-TBG FRG	3	10	33	500	1800	DGR	52	SLO								X	X	X								862
	A	676	T	V2 FRG FWD	3	10	35	500	1800	DGR	52	SLO								X	X	X								862
	A	677	T	V2 FRG CTR	3	10	37	500	1800	DGR	52	SLO								X	X	X								862
	A	678	T	V2 FRG SIDE	3	10	39	500	1800	DGR	52	SLO								X	X	X								862
	A	679	T	V2 FRG AFT	3	10	41	500	1800	DGR	52	SLO								X	X	X								862
	A	682	T	#1 AIG POD INSUL OUT	3	11	11	500	1500	DGR	40	SLO					X	X	X											862
	A	683	T	#1 AIG POD INSUL IN	3	11	13	500	1500	DGR	40	SLO					X	X	X											862

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM/REC	SUBCARRIER/TRACK	COMM PIN/CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	28 / 13	30 / 14	32 / 15	35 / 16	38 / 17	40 / 19	
	A	684	T	#2 AIG POD INSUL OUT	3	11	15	500	1500	DGR	40	SLO						X	X	X										862
	A	685	T	#2 AIG POD INSUL IN	3	11	17	500	1500	DGR	40	SLO						X	X	X										862
	A	686	T	#3 AIG POD INSUL OUT	3	11	19	500	1500	DGR	40	SLO						X	X	X										862
	A	687	T	#3 AIG POD INSUL IN	3	11	21	500	1500	DGR	40	SLO						X	X	X										862
	A	~~688~~	T	~~#4 AIG POD INSUL OUT~~	3	11	23	500	1500	DGR	[illegible]	SLO						X	X	X										~~862~~
	A	689	T	#4 AIG POD INSUL IN	3	11	43	500	1500	DGR	40	SLO						X	X	X										862
	A	690	T	#5 AIG POD INSUL OUT	3	11	45	500	1500	DGR	40	SLO						X	X	X										862
	A	691	T	#5 AIG POD INSUL IN	3	11	47	500	1500	DGR	40	SLO						X	X	X										862
	A	692	T	B1 NACELLE INSUL FWD	3	10	19	500	1500	DGR	40	SLO						X	X	X										862
	A	693	T	B2 NACELLE INSUL FWD	3	10	21	500	1500	DGR	40	SLO						X	X	X										862
	A	694	T	B1 NACELLE INSUL CTR	3	10	23	500	1500	DGR	40	SLO						X	X	X										862
	A	695	T	B2 NACELLE INSUL CTR	3	10	31	500	1500	DGR	40	SLO						X	X	X										862
	A	696	T	B1 NACELLE INSUL AFT	3	10	33	500	1500	DGR	40	SLO						X	X	X										862
	A	697	T	B2 NACELLE INSUL AFT	3	10	35	500	1500	DGR	40	SLO						X	X	X										862
	A	698	T	B1 AFT FRG INSUL OUT	3	10	15	500	1800	DGR	52	SLO									X	X	X							862
	A	699	T	B1 AFT FRG INSUL IN	3	10	17	500	1800	DGR	52	SLO									X	X	X							862
	A	~~752~~	T	~~LO2 TANK SKIN STA516~~	3	10	43	500	1800	DGR	52	SLO									X	X	X							~~1200~~
	A	~~753~~	T	~~LO2 TANK SKIN STA575~~	3	10	45	500	1800	DGR	52	SLO									X	X	X							~~1200~~
	A	754	T	LO2 TANK SKIN STA640	3	10	47	500	1800	DGR	52	SLO									X	X	X							1200
	A	755	T	LO2 TANK SKIN STA652	3	10	49	500	1800	DGR	52	SLO									X	X	X							1200
	A	793	T	LO2 TANK SKIN STA662	3	10	51	500	1800	DGR	52	SLO									X	X	X							1200
	A	1806	T	ROT INVTR B2 POD Q2		MP		30	240	DGF	4%	SLO			X					X										1753
	A	1807	T	ROT INVTR B2 POD Q2		MP		30	240	DGF	4%	SLO			X					X										1753
	A	1808	T	ROT INVTR B2 POD Q2		MP		30	240	DGF	4%	SLO			X					X										1753
	A	1809	T	ROT INVTR B2 POD Q2		MP		30	240	DGF	4%	SLO			X					X										1753
	A	1810	T	ROT INVTR B2 POD Q2		MP		30	240	DGF	4%	SLO			X					X										1753
	A	1815	T	ROT INVTR B2 POD Q2		MP		30	240	DGF	4%	SLO			X					X										1753
	A	1816	T	ROT INVTR B2 POD Q2		MP		30	240	DGF	4%	SLO			X					X										1753
	A	1817	T	ROT INVTR B2 POD Q2		MP		30	240	DGF	4%	SLO			X					X										1753
	A	1818	T	A/P GYRO GROUP YY		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1819	T	A/P ELECT PG YY		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1820	T	INVTR BAT B2 POD B2		MP		30	100	DGF	4%	SLO			X					X										1753
	A	1822	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / SEC	MUX CARRIER / TRACE	COMM / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	A	1823	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1824	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	A	846	T	AEDC CALOR B	3	11	41	0	1300	DGF	4%	SLO		•	X		X													1637
	A	847	T	AEDC CALOR E	3	11	43	0	1300	DGF	4%	SLO		X	X		X													1637
	~~A~~	~~848~~	~~T~~	~~AEDC CALOR F~~	~~3~~	~~11~~	~~45~~	~~0~~	~~1300~~	~~DGF~~	~~4%~~	~~SLO~~		~~•~~	~~X~~		~~X~~													~~1637~~
	A	1901	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1902	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1903	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1904	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1905	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1906	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1907	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1908	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1909	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1910	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1911	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	~~A~~	~~1912~~	~~T~~	~~GE PB B1 POD Q4~~		~~MP~~		~~30~~	~~180~~	~~DGF~~	~~4%~~	~~SLO~~			~~X~~					~~X~~										~~1753~~
	~~A~~	~~933~~	~~T~~	~~AEDC AFT SHLD CALOR~~	~~3~~	~~10~~	~~41~~	~~0~~	~~1300~~	~~VDC~~	~~4~~	~~SLO~~						~~X~~	~~X~~											~~1511~~
	~~A~~	~~934~~	~~T~~	~~AEDC AFT SHLD CALOR~~	~~3~~	~~10~~	~~43~~	~~0~~	~~1300~~	~~DGF~~	~~4~~	~~SLO~~						~~X~~	~~X~~											~~1511~~
	~~A~~	~~935~~	~~T~~	~~AEDC AFT SHLD CALOR~~	~~3~~	~~10~~	~~45~~	~~0~~	~~1300~~	~~DGF~~	~~4~~	~~SLO~~						~~X~~	~~X~~											~~1511~~
	A	1936	T	GE PB B1 POD Q4		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1937	T	TLM #2 B1 POD Q1		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1938	T	TLM #2 B1 POD Q1		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1939	T	TLM #2 B1 POD Q1		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1940	T	TLM #2 B1 POD Q1		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1941	T	TLM #2 B1 POD Q1		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1942	T	TLM #2 B1 POD Q1		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1943	T	TLM #2 B1 PCD Q1		MP		30	180	DGF	4%	SLO			X					X										1753
	A	1944	T	TLM #2 B1 POD Q1		MP		30	180	DGF	4%	SLO			X					X										1753
	A	978	T	GE BOOM ANT STRUT	3	10	11	500	2500	DGR	80	SLO									X	X	X							1629
	A	979	T	GE BOOM ANT STRUT	3	10	13	500	2500	DGR	80	SLO									X	X	X							1629
	D	1	V	RSC CUTOFF OUTPUT	1	6	S	0	28	VDC	3	BLP	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		1074

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM/ESG	SUBCARRIER/TRACK	COMM PIN/CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	D	1	V	RSC CUTOFF OUTPUT	1	6	S	0	28	VDC	3	STP													X				X	
	D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	28	VDC	3	STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1074
	D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	100K	UV	5*	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	D	5142	V	RSC #1 BAT DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	D	5143	V	RSC #2 BAT DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	D	5140	W	RSC #1 TOTAL TIMER		M		0	1000	HR			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	D	5141	W	RSC #2 TOTAL TIMER		M		0	1000	HR			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	D	5150	W	RSC #1 & 2 BAT TIMER		M		0	1000	HR			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	D	3	X	RSC DESTRUCT OUTPUT	1	C	9S	0	30	VDC		STP													X				X	
	D	3	X	RSC DESTRUCT OUTPUT	2	E	9S	0	30	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	E	1043	C	CRITICAL POWER A				0	800	A	8	4				X			X		X		X							OD
	E	1044	C	CRITICAL POWER B				0	800	A	8	4				X			X		X		X							OD
	E	1045	C	CRITICAL POWER C				0	800	A	8	4				X			X		X		X							OD
	~~E~~	~~66~~	~~C~~	~~MISSILE DC AMPS~~	~~3~~	~~11~~	~~11~~	~~30~~	~~75~~	~~MV~~	~~5%~~	~~SLO~~														~~X~~	~~X~~			~~1807~~
	~~E~~	~~5066~~	~~C~~	~~MISSILE DC AMPS~~		~~M~~		~~0~~	~~200~~	~~AMP~~			~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	
	~~E~~	~~5068~~	~~C~~	~~EMERGENCY GENERATOR~~		~~M~~		~~0~~	~~200~~	~~AMP~~			~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	
	E	5005	Q	INVERTER FREQUENCY		M		350	450	CPS	4	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	E	5029	Q	MISSILE EXT PHASE A		M		350	450	CPS	4	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	E	5031	Q	PHASE A EXT @ MSL		M		396	404	CPS			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	E	50	Q	400 CYCLE AC PWRSUP	1	1		370	430	CPS	4	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	658
	E	5003	V	BATTERY OUTPUT		M		15	35	VDC	.6	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	E	5006	V	INVERTER PHASE A		M		90	140	VAC	2.5	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	E	5022	V	MISSILE AC EXT @ MSL		M		110	120	VDC			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	E	5023	V	MISSILE EXTERNAL AC		M		110	120	VAC			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	E	28	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC	1.0	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	E	5030	V	MISSILE DC EXT @ MSL		M		0	40	VDC			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC	1.0	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	E	53	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC	1.0	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / REC	SUBCARRIER / TRACK	COMM PIX / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / [illegible]	9 / 4	12 / 5	13 / 6	16 / 7	17 / 6	18 / 9	21 / 10	22 / 11	23 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	E	53	V	CONNECTED TO 1 13 23	1	13	53						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	E	5065	V	MISSILE EXTERNAL DC		M		0	40	VDC			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	E	5109	W	MAIN MSL BATT TIMER		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	~~E~~	~~5110~~	~~W~~	~~INVERTER TIMER~~		~~M~~							~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	
	F	1309	D	GND LO2 TK VENT VLV		R		OPN	CLS			SLO	X	X	X	X	X	X												1466
	F	1	P	LO2 TANK H[illegible]IUM	1	13	33	0	45	PIA	1.8	SLO	X	X	X	X	X	X	X											OD
	F	1	P	LOX TANK HELIUM	1	C	19	0	45	PIA	1.8	SLO													X				X	
	F	1	P	CONNECTED TO 1 C 19	1	C	49																		X				X	
	F	1	P	LO2 TANK HELIUM	2	[illegible]	29	0	45	PIA	1.8	SLO								X	X	X	X	X		X	X	X		1756
	F	1001	P	LO2 TANK HELIUM		S		0	50	PIA	1	SLO	@	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	F	5001	P	LO2 TANK HELIUM		M		0	50	PIA	1	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA	3	SLO	X	X	X	X	X	X	X											OD
	F	3	P	FUEL TANK HELIUM	1	C	21	0	100	PIA	3	SLO													X				X	
	F	3	P	CONNECTED TO 1 C 21	1	C	51																		X				X	
	~~F~~	~~3~~	~~P~~	~~FUEL TANK HELIUM~~	~~2~~	~~E~~	~~3~~	~~0~~	~~100~~	~~PIA~~		~~SLO~~								~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		~~X~~	~~X~~	~~X~~		~~1756~~
	~~F~~	~~3~~	~~P~~	~~CONNECTED TO 2 E 3~~	~~2~~	~~E~~	~~35~~													~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		~~X~~	~~X~~	~~X~~		~~1756~~
	F	1003	P	FUEL TANK HELIUM		S		0	75	PIA	1.5	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	F	5003	P	FUEL TANK HELIUM		M		0	75	PIA	1.5	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	F	1003	P	FUEL TANK HELIUM		F		0	75	PIA	1.5	SLO									X	X	X	X	X	X				1756
	F	5032	P	LN2 PRESSURE		M		0	400	PIG			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	F	34	P	FUEL PRESS ORIFIC DP	1	13	51	0	7	PID	.3	SLO		X						X										1660
	F	34	P	FUEL PRESS ORIFIC DP	1	A	21	0	7	PID	[illegible]	SLO										X								1776
	F	1047	P	PCU FUEL SENSOR LINE		S		0	75	PIG	1	SLO																		1436
	F	1050	P	PCU LOX SENSOR LINE		S		0	30	PIG	1	SLO																		1436
	F	5053	P	NORM SUP PRESSURE		M		0	4000	PIG			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	F	5054	P	EMERG SUP PRESSURE		M		0	4000	PIG			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	F	65	P	LO2 TK HE LIN @ ORFC	1	A	51	0	45	PIA	.5	SLO	X	X						X	X	X	X							1660
	F	114	P	LO2 PRESS REG INLET	1	13	45	0	3000	PIA		SLO	X	X		X														561
	F	5116	P	DIFFERENTIAL PRESS		M		0	30	PID	.2	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	F	1116	P	DIFFERENTIAL PRESS		F		0	25	PID	.5	30										X								1818

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / RSC	SUBCARRIER / TRACK	COMM PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCT ON	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	F	145	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA	175	SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		444
	F	145	P	S CTL HE BTL DISCH	1	13	35	0	3500	PIA	175	SLO													X				X	
	F	1145	P	S CTL HE BTL DISCH		S		0	3500	PIA	175	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	F	5145	P	S CTL HE BTL DISCH		M		0	3500	PIA	105	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	~~F~~	~~147~~	~~P~~	~~LOX PRESS ORFC DP~~	~~1~~	~~A~~	~~49~~	~~0~~	~~5~~	~~PID~~	~~.1~~	~~SLO~~		~~X~~						~~X~~	~~X~~	~~X~~	~~X~~							~~1660~~
	F	1194	P	FACILITY GN2 SUPPLY		S		0	2500	PI*	48	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1334
	F	212	P	FUEL PRESS ORIFIC IN	1	A	23	40	70	PIG	2.1	SLO										X								1776
	F	212	P	FUEL PRESS ORIFIC IN	2	11	37	40	70	PIG	2.1	SLO		X						X										1660
	F	246	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA	105	SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	F	246	P	BTANK HE BOTTLES HI	1	13	47	0	3500	PIA	105	SLO													X				X	
	F	1246	P	B TANK HE BOTTLES HI		S		0	3500	PIA	105	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	F	5246	P	B TANK HE BOTTLES HI		M		0	3500	PIA	65	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	F	260	P	B TK HE BOTTLES LO	1	12	31	0	400	PIA	10	SLO	X	X																
	F	1301	P	GND LOX ULLAGE TANK		S		20	35	PIG	.1	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1466
	F	1302	P	GND FUEL ULLAGE TANK		S		55	65	PIG	.1	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1466
	F	1826	P	AIG POD AIR INLET Q2				0	1	PIG	.05	SLO		X																1347
	~~F~~	~~1828~~	~~P~~	~~AIG POD AIR INLET Q3~~				~~0~~	~~1~~	~~PIG~~	~~.05~~	~~SLO~~		~~X~~																~~1347~~
	~~F~~	~~17~~	~~T~~	~~FUEL PRESS ORIFIC IN~~	~~1~~	~~11~~	~~31~~	~~0~~	~~500~~	~~DGF~~	~~12~~	~~SLO~~										~~X~~								~~1776~~
	~~F~~	~~17~~	~~T~~	~~FUEL PRESS ORIFIC IN~~	~~1~~	~~11~~	~~43~~	~~0~~	~~500~~	~~DGF~~	~~12~~	~~SLO~~		~~X~~						~~X~~										~~1660~~
	~~F~~	~~97~~	~~T~~	~~LOX TK ULG STA 787~~	~~3~~	~~11~~	~~17~~	~~150~~	~~1050~~	~~DGF~~	~~4%~~	~~SLO~~										~~X~~								~~1776~~
	F	97	T	LOX TK ULG STA 787	3	11	41	150	1050	DGF	4%	SLO								X										1705
	F	115	T	LO2 PRESS REG INLET	1	11	5	0	500	DGF		SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	F	146	T	LO2 PRESS ORFC IN	1	11	11	0	500	DGF	4%	SLO	X	X						X	X	X	X							1660
	F	247	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	561
	F	5247	T	B TANK HE BOTTLES		M		M320	M250	DGF	2	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	F	290	T	S CTL HE BOTTLE	1	11	41	M100	100	DGF		SLO	X																	OD
	F	5290	T	S CTL HE BOTTLE		M		M100	300	DGF	4	SLO	X																	
	F	371	T	LOX TK ULG STA 691	3	11	19	150	1050	DGR	4%	SLO										X								1776
	F	371	T	LOX TK ULG STA 691	3	11	53	150	1050	DGR	4%	SLO								X										1705
	F	374	T	LOX TK ULG STA 807	3	11	1	150	1050	DGR	4%	SLO								X										1705
	F	374	T	LOX TK ULG STA 807	3	11	21	150	1050	DGR	4%	SLO										X								1776
	F	375	T	LOX TK ULG STA 827	3	11	3	150	1050	DGR	4%	SLO								X										1705

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Vehicle	System	Measurement Number	Type Measurement	Description	TLM/SEC	Subcarrier/Track	Comm/Pin/Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	F	375	T	LOX TK ULG STA 827	3	11	23	150	1050	DGR	4%	SLO										X								1776
	F	376	T	LOX TK ULG STA 846	3	11	43	150	1050	DGR	4%	SLO										X								1776
	F	376	T	LOX TK ULG STA 846	3	10	47	150	1050	DGR	4%	SLO								X										1705
	F	377	T	LOX TK ULG STA 867	3	11	45	150	1050	DGR	4%	SLO										X								1776
	F	377	T	LOX TK ULG STA 867	3	10	49	150	1050	DGR	4%	SLO								X										1660
	F	771	T	LOX TK HE INLET	1	11	1	500	1000	DGR	4	SLO								X	X	X	X							1484
	F	773	T	LOX TK ULG STA 540	3	11	31	150	1050	DGR	4%	SLO								X	X	X	X							1660
	F	774	T	LOX TK ULG STA 570	3	11	33	150	1050	DGR	4%	SLO								X										1660
	F	774	T	LOX TK ULG STA 570	3	11	47	150	1050	DGR	4%	SLO										X								1776
	F	775	T	LOX TK ULG STA 600	3	11	39	150	1050	DGR	4%	SLO									X	X	X							1123
	F	775	T	LOX TK ULG STA 600	3	11	35	150	1050	DGR	4%	SLO								X										1660
	F	776	T	LOX TK ULG STA 630	3	11	49	150	1050	DGR	4%	SLO										X								1776
	F	776	T	LOX TK ULG STA 630	3	11	51	150	1050	DGR	4%	SLO								X										1660
	F	7	T	LOX TK ULG STA 660	3	11	35	150	1050	DGR	4%	SLO									X	X	X							1123
	F	777	T	LOX TK ULG STA 650	3	11	37	150	1050	DGR	4%	SLO								X										1660
	F	780	T	LOX TK ULG STA 720	3	11	37	150	1050	DGR	4%	SLO									X	X	X							1123
	F	780	T	LOX TK ULG STA 720	3	11	39	150	[illegible]	DGR	4%	SLO								X										1660
	F	781	T	LOX TK ULG STA 740	3	11	51	150	1050	DGR	4%	SLO										X								1776
	F	781	T	LOX TK ULG STA 740	3	10	51	150	1050	DGR	4%	SLO								X										1660
	F	782	T	LOX TK ULG STA 762	3	11	53	150	1050	DGR	4%	SLO										X								1776
	F	782	T	LOX TK ULG STA 762	3	10	53	15.	1050	DGR	4%	SLO								X										1660
	F	783	T	LOX TK ULG STA 780	3	11	39	150	1050	DGF	4%	SLO									X		X							1123
	F	786	T	LOX TK ULG STA 640	3	11	41	150	1050	DGR	4%	S_O									X		X							1123
	F	1827	T	AIG POD AIR INLET Q2				30	60	DGF	2	SLO	X																	1347
	F	1829	T	AIG POD AIR INLET Q3				30	60	DGF	2	SLO	X																	1347
	F	1831	T	EXHST AREA AMB TEMP				30	60	DGF	2	SLO	X																	1347
	F	1832	T	FWD FACE PLATF SKIN				30	60	DGF	2	SLO	X																	1347
	F	1833	T	FWD FACE PLATF SKIN				30	60	DGF	2	SLO	X																	1347
	F	1834	T	FWD FACE PLATF SKIN				30	60	DGF	2	SLO	X																	1347
	F	1835	T	AFT FACE PLATF SKIN				30	60	DGF	2	SLO	X																	1347
	F	1836	T	AFT FACE PLATF SKIN				30	60	DGF	2	SLO	X																	1347
	F	1837	T	AFT FACE PLATF SKIN				30	60	DGF	2	SLO	X																	1347
	F	1838	T	POD AMB TEMP				30	60	DGF	2	SLO	X																	1347

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / REC	SUBCARRIER / TRACK	COMM PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4/2	8/3	9/4	12/5	13/6	16/7	17/8	18/9	21/10	22/11	25/12	26/13	30/14	32/15	35/16	36/17	40/19	
	F	844	T	FUEL TK HE STA 925	1	11	17	M50	300	DGF	20	SLO										X								1851
	F	846	T	FUEL TK HE STA 945	1	11	33	M50	300	DGF	20	SLO										X								1851
	F	845	T	FUEL TK HE STA 935	1	11	21	M50	300	DGF	20	SLO										X								
	G	302	C	PB-IP MODULATOR AVG	1	11	53	M1.7	0	VDC		SLO	X	X	X	X	X													1427
	G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA	.03	SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	G	504	C	CONNECTED TO 1 11 7	1	11	37										X	X	X	X	X	X	X	X		X	X	X		OD
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E	.45	SLO	X	X	X	X	X	X	X	X	X		X	X		X	X	X		OD
	G	582	E	CONNECTED TO 1 11 3	1	11	33										X	X	X	X	X		X	X		X	X	X		OD
	G	94	O	BOOM ANTENNA	1	C	17			G		1KC			X	X	X													1400
	G	94	O	CROSS CONNECT THRU	1	C	23								X	X	X													1400
	G	94	O	CONNECTED TO 1 C 23	1	C	25								X	X	X													1400
	G	94	O	CROSS CONNECT THRU	1	C	31								X	X	X													
	G	196	O	PB-IP RADIAL	1	C	1	M15	15	G	5%	2KC							X											1803
	G	196	O	CROSS CONNECT THRU	1	C	7												X											1803
	G	196	O	CONNECTED TO 1 C 7	1	C	9												X											1803
	G	196	O	CROSS CONNECT THRU	1	C	15												X											1803
	G	197	O	RB-IP RADIAL	1	C	1	M15	15	G	5%	2KC			X	X	X													1400
	G	197	O	CROSS CONNECT THRU	1	C	7								X	X	X													1400
	G	197	O	CONNECTED TO 1 C 7	1	C	9								X	X	X													1400
	G	197	O	CROSS CONNECT THRU	1	C	15								X	X	X													
	G	587	O	POD WAVEGUIDE	1	C	17	M15	15	G	5%	2KC							X											1871
	G	587	O	CROSS CONNECT THRU	1	C	23												X											1871
	G	587	O	CONNECTED TO 1 C 23	1	C	25												X											1871
	G	587	O	CROSS CONNECT THRU	1	C	31												X											1871
	G	587	O	POD WAVEGUIDE	1	C	33			G		1KC			X	X	X													1400
	G	587	O	CROSS CONNECT THRU	1	C	39								X	X	X													1400
	G	587	O	CONNECTED TO 1 C 39	1	C	41								X	X	X													1400
	G	587	O	CROSS CONNECT THRU	1	C	47								X	X	X													
	G	595	O	PB WAVEGUIDE RAD	1	C	33	M15	15	G	5%	2KC							X											1871
	G	595	O	CROSS CONNECT THRU	1	C	39												X											1871
	G	595	O	CONNECTED TO 1 C 39	1	C	41												X											1871

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / SEC	SUBCARRIER / TRACK	COMM PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	G	595	O	CROSS CONNECT THRU	1	C	47												X											1871
	G	588	P	WAVEGUIDE PRESSURE 1	1	12	7	0	20	PIA		SLO	X	X	X	X	X													1400
	G	589	P	WAVEGUIDE PRESSURE 2	1	12	9	0	20	PIA		SLO	X	X	X	X	X													1400
	G	281	V	RB REFLECT SET	1	11	49	M2.5	0	VDC		SLO	X	X	X	X	X													1427
	G	503	V	MOD III PD AGC	1	11	17	0	M4.8	VDC	.15	SLO	X	X	X	X	X	X	X	X	X		X	X		X	X	X		OD
	G	503	V	CONNECTED TO 1 11 17	1	11	47						X	X	X	X	X	X	X	X	X		X	X		X	X	X		
	G	503	V	MOD III PB AGC	1	11	47	0	M4.8	VDC	.15	SLO										X								1886
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO	X	X	X	X	X	X	X	X	X		X	X		X	X	X		OD
	G	579	V	CONNECTED TO 1 11 21	1	11	51						X	X	X	X	X	X	X	X	X		X	X		X	X	X		
	G	579	V	MOD III RB AGC NO.1	1	11	51					SLO										X								1886
	H	382	O	SUSTAINER HYD PUMP	2	13		M50	50	G	5%			●	X															1637
	H	411	O	NAA CONTROL X AXIS	1	C	9	M50	50	G	5%	250		●																1616
	H	411	O	CROSS CONNECT THRU	1	C	15							●																~~1616~~
	~~H~~	~~412~~	~~O~~	~~NAA CONTROL Y AXIS~~	~~1~~	~~C~~	~~25~~	~~M50~~	~~50~~	~~G~~	~~5%~~	~~250~~		●																~~1616~~
	~~H~~	~~412~~	~~O~~	~~CROSS CONNECT THRU~~	~~1~~	~~C~~	~~31~~							●																~~1616~~
	~~H~~	~~413~~	~~O~~	~~NAA CONTROL Z AXIS~~	~~3~~	~~10~~		~~M50~~	~~50~~	~~G~~	~~5%~~	~~250~~		●																~~1616~~
	H	3	P	B HYD PUMP DISCH	2	11	39	0	3500	PIA	2%	SLO	X																	1531
	H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA	140	SLO	X	X	●	X	X	X	X	X	X	X	X	X		X	X	X		OD
	H	33	P	B1 HYD ACCUMULATOR	1	13	33	0	3500	PIA	140	SLO													X				X	
	H	34	P	B2 HYD ACCUMULATOR	2	11	53	0	3500	PIA	2%	SLO	X																	1531
	H	52	P	S HYD ACCUMULATOR	1	A	3	0	3500	PIA	5%	SLO	X	●																
	H	52	P	S HYD ACCUMULATOR	2	11	51	0	3500	PIA	5%	SLO				X	X													1710
	H	130	P	S HYD PUMP DISCH	1	11	3	0	3500	PIA	5%	SLO													X				X	
	H	130	P	CONNECTED TO 1 11 3	1	11	33																		X				X	
	H	130	P	S HYD PUMP DISCH	1	13	1	0	3500	PIA	5%	SLO						X	X	X	X	X	X	X		X	X	X		1749
	H	130	P	S HYD PUMP DISCH	1	A	21	0	3500	PIA	5%	SLO	X																	
	H	130	P	S HYD PUMP DISCH	3	4		0	3500	PIA	5%	SLO		●	●	●	●													1717
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA	45	SLO	X	●	●	X	X	X	X	X	X	X	X	X		X	X	X		OD
	H	140	P	SUS/VERN HYD PRESS	1	13	51	0	3500	PIA	45	SLO													X				X	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / RSC	SUBCARRIER / TRACK	COMM / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 2	6 3	9 4	12 5	13 6	16 7	17 8	18 9	22 10	22 11	25 12	26 13	30 14	32 15	35 16	36 17	40 19	
	H	185	P	S HYD PUMP INLET	1	11	7	0	200	PIA	5%	SLO													X				X	
	H	185	P	S HYD PUMP INLET	1	12	9	0	200	PIA	5%	SLO						X	X	X	X	X	X	X		X	X	X		1749
	H	185	P	S HYD PUMP INLET	2	11	41	0	100	PIA	5%	SLO	X																	
	H	185	P	S HYD PUMP INLET	3	5		0	200	PIA	5%	SLO		●	●	●	●													1717
	~~H~~	~~191~~	~~P~~	~~S HI PR TO MANIFOLD~~	~~1~~	~~11~~	~~17~~	~~0~~	~~3500~~	~~PIA~~	~~5%~~	~~SLO~~													X				X	
	H	191	P	S HI PR TO MANIFOLD	1	12	31	0	3500	PIA	5%	SLO						X	X	X	X	X	X	X		X	X	X		1749
	H	191	P	S HI PR TO MANIFOLD	1	A	21	0	3500	PIA	5%	SLO		●																1588
	H	191	P	S HI PR TO MANIFOLD	1	A	51	0	3500	PIA	5%	SLO			●		●													1637
	H	191	P	S HI PR TO MANIFOLD	1	A	53	0	3500	PIA	5%	SLO				●														1717
	H	212	P	VERNIER RETURN	1	11	21	0	200	PIA	5%	SLO													X				X	
	H	212	P	VERNIER RETURN	1	A	21	0	200	PIA	5%	SLO				X														1717
	H	212	P	VERNIER RETURN	1	A	49	0	200	PIA	5%	SLO			X		X													1637
	H	212	P	VERNIER RETURN	1	A	53	0	200	PIA	5%	SLO		●																1603
	H	212	P	VERNIER RETURN	2	11	51	0	200	PIA	5%	SLO						X	X	X	X	X	X	X		X	X	X		1749
	H	219	P	S TK RESVR GAS	2	11	41	0	200	PIA	3%	SLO			X	X	X													1166
	H	224	P	B HYD SUS LO PRESS	1	11	37	0	200	PIA	5%	SLO													X				X	
	~~H~~	~~224~~	~~P~~	~~B HYD SYS LO PRESS~~	~~2~~	~~11~~	~~37~~	~~0~~	~~200~~	~~PIA~~	~~3%~~	~~SLO~~	X																	~~1591~~
	~~H~~	~~224~~	~~P~~	~~B HYD SYS LO PRESS~~	~~2~~	~~11~~	~~39~~	~~0~~	~~200~~	~~PIG~~	~~3%~~	~~SLO~~			X	X	X													~~1166~~
	~~H~~	~~224~~	~~P~~	~~B HYD SYS LO PRESS~~	~~2~~	~~11~~	~~53~~	~~0~~	~~200~~	~~PIA~~	~~5%~~	~~SLO~~						X	X	X	X	X	X	X		X	X	X		~~1749~~
	~~H~~	~~225~~	~~P~~	~~B TK RESVR GAS~~	~~1~~	~~A~~	~~3~~	~~0~~	~~200~~	~~PIG~~	~~3%~~	~~SLO~~			X	X	X													~~1166~~
	~~H~~	~~1360~~	~~P~~	~~HPU SUSTAINER RETURN~~		~~G~~		~~0~~	~~150~~	~~PIA~~	~~2%~~	~~SLO~~		●		●														~~1717~~
	H	1360	P	HPU SUSTAINER RETURN		G		0	200	PIA	2%	SLO			●		●	X	X	X	X	X	X	X	X	X	X	X	X	1749
	H	379	P	SUS ROD LINE HI PR	2	11	37	0	3500	PIA	5%	SLO			●															1637
	H	379	P	SUS ROD LINE HI PR	2	11	39	0	3500	PIA	5%	SLO		●																1588
	H	380	P	SUS STAGE LINE HI PR	1	13	51	0	3500	PIA	5%	SLO			●															1637
	H	380	P	SUS STAGE LINE HI PR	2	11	41	0	3500	PIA	5%	SLO		●																1588
	H	380	P	SUS STAGE LINE HI PR	2	11	53	0	3500	PIA	5%	SLO				X														1748
	H	381	P	BOOSTER ROD LN HI PR	2	11	53	0	3500	PIA	5%	SLO		●	●															1637
	H	398	P	NAA HYD ACCUM GAS	1	12	31	0	3500	PIA	5%	SLO			●	●	●													1717
	H	398	P	NAA HYD ACCUM GAS	1	13	47	0	3500	PIA	5%	SLO		●																1616
	H	408	P	HS VALVE OPEN	1	13	13	0	3500	PIA	5%	SLO		●																1616
	H	409	P	PU VALVE OPEN	2	11	49	0	3500	PIA	5%	SLO		●																1616
	H	410	P	GG VALVE OPEN	2	[illegible]	[illegible]	0	3500	PIA	5%	SLO		●																1616

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / SEC	SUBCARRIER / TRACK	COMM PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS & FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY & FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	28 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	H	414	P	PU VLV CLS-SERVO	1	13	47	0	3500	PIG	70	10				X														1775
	H	414	P	PU VLV CLS-SERVO	1	A	21	0	3500	PIG	70	10						X		X										1775
	H	383	R	SUS FLOW TO RES	3	12	1	0	9	GPM	5%	SLO			•	•	•													1717
	H	383	R	SUS FLOW TO RES	3	12	1	0	10	GPM				•																1598
	H	383	R	CROSS CONNECT	3	12	7							•	•	•	•													1717
	H	383	R	CROSS CONNECT	3	12	25							•	•	•	•													1717
	H	383	R	CROSS CONNECT	3	12	31							•	•	•	•													1717
	H	384	R	SUS FLOW TO NAA CONT	3	12	9	0	9	GPM	5%	SLO			•	•	•													1717
	H	384	R	SUS FLOW TO NAA CONT	3	12	9	0	16	GPM				•																1598
	H	384	R	CROSS CONNECT	3	12	15							•	•	•	•													1717
	H	384	R	CROSS CONNECT	3	12	33							•	•	•	•													1717
	H	384	R	CROSS CONNECT	3	12	39							•	•	•	•													1717
	H	385	R	SUS FLOW FROM V MAN	2	12		0	9	GPM	5%	SLO			•	•	•													1717
	H	385	R	SUS FLOW FROM V MAN	2	12		0	16	GPM				•																1598
	H	386	R	SUS FLOW TO MAN	3	12	17	0	9	GPM	5%	SLO			•	•	•													1717
	H	386	R	SUS FLOW TO MAN	3	12	17	0	10	GPM				•																1598
	H	386	R	CROSS CONNECT	3	12	23							•	•	•	•													1717
	H	386	R	CROSS CONNECT	3	12	41							•	•	•	•													1717
	H	386	R	CROSS CONNECT	3	12	47							•	•	•	•													1717
	H	1	T	B HYD PUMP DISCH	1	11	15	0	300	DGF	7.6	SLO									X	X	X							1276
	H	131	T	S HYD PUMP DISCH	1	11	43	0	300	DGF	7.6	SLO									X	X	X							1276
	H	184	T	SKIN S HYD PUMP	1	11	41	0	600	DGF	5%	SLO		•																1588
	H	316	T	ROD PANEL SUS IN	3	11	3.	0	1000	DGF	5%	SLO		•	•		•													1637
	H	317	T	ROD PANEL BOOSTER IN	3	11	37	0	1000	DGF	5%	SLO		•	•		•													1637
	H	1187	X	BSTR OIL EVACUATION		R		ON	OFF	VDC		STP		X	X	X	X	X	X	X	X	X	x	X	X	X	X	X	X	1749
	H	1188	X	SUST OIL EVACUATION		R		ON	OFF	VDC		STP		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1749
	H	227	X	S TK RESVR PISTON	1	A	15	ON	OFF						X		X													1166
	H	387	X	S ENG CNTL BRACKET	1	13	1	ON	OFF	VDC		STP		•	•	•	•													1717
	H	388	X	ENG CNTL TO PR LINE	1	13	19	ON	OFF	VDC		STP		•	•	•	•													1717
	H	389	X	HYD MANIFOLD TO CONE	1	13	35	ON	OFF	VDC		STP		•	•	•	•													1717

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	T/M / REC	SUBCARRIER / TRACE	COMM PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OF FREQUENCY OF FUNCTION	4/2	8/3	9/4	12/5	13/6	16/7	17/8	18/9	21/10	22/11	25/12	26/13	30/14	32/15	35/16	36/17	40/19	
	I	513	A	ACCEL XF1 DIRECT	3	C		M12	12	G			●	●	●	●	●	X	●	●	X	X	X	X		X	X	X		422
	I	514	A	ACCEL XF2 DIRECT	3	E		M12	12	G			●	●	●	●	●	X	●	●	X	X	X	X		X	X	X		OD
	I	1515	A	ACCELEROMETER XF1				M12	12	G			X	●	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
	I	516	A	ACCELEROMETER YF1	2	A		M12	12	G			●	●	●	●	●	X	●	●	X	X	X	X		X	X	X		OD
	~~I~~	~~1516~~	~~A~~	~~ACCELEROMETER YF1~~				~~M12~~	~~12~~	~~G~~			X	●	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
	I	517	A	ACCELEROMETER ZF1	3	13		M12	12	G			●	●	●	●	●	X	●	●	X	X	X	X		X	X	X		OD
	I	1517	A	ACCELEROMETER ZF1				M12	12	G			X	●	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
	I	1518	A	ACCELEROMETER XF2				M12	12	G			X	●	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
	I	519	A	ACCELEROMETER YF2	2	C		M12	12	G			●	●	●	●	●	X	●	●	X	X	X	X		X	X	X		OD
	I	1519	A	ACCELEROMETER YF2				M12	12	G			X	●	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
	I	520	A	ACCELEROMETER ZF2	3	A		M12	12	G			●	●	●	●	●	X	●	●	X	X	X	X		X	X	X		OD
	I	1520	A	ACCELEROMETER ZF2				M12	12	G			X	●	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
	I	1591	C	PITCH GYRO TORQUE				0	30	MA			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	897
	I	1592	C	ROLL GYRO TORQUE				0	17	MA			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	897
	I	1593	C	YAW GYRO TORQUE				0	15	MA			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	897
	~~I~~	~~549~~	~~D~~	~~PITCH SERVO ERROR~~	~~1~~	~~7~~		~~M4.1~~	~~4.1~~	~~MIN~~		~~20~~													X				X	
	~~I~~	~~549~~	~~D~~	~~PITCH SERVO ERROR~~	~~1~~	~~C~~	~~3~~	~~M4.1~~	~~4.1~~	~~MIN~~		~~20~~													X				X	
	~~I~~	~~549~~	~~D~~	~~CONNECTED TO 1 C 3~~	~~1~~	~~C~~	~~33~~																		X				X	
	I	549	D	PITCH SERVO ERROR	2	6		M4.1	4.1	MIN		20	●	●	●	X	●	X	X	●	X	X	X	X		X	X	X		OD
	I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20	●	●	●	X	●	X	X	●	X	X	X	X		X	X	X		OD
	I	550	D	ROLL SERVO ERROR	1	9		M4.1	4.1	MIN		100													X				X	
	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	MIN		100	●	●	●	X	●	X	X	●	X	X	X	X		X	X	X		OD
	I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100	●	●	●	X	●	X	X	●	X	X	X	X		X	X	X		OD
	I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100	●	●	●	X	●	X	X	●	X	X	X	X		X	X	X		OD
	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100	●	●	●	X	●	X	X	●	X	X	X	X		X	X	X		OD
	I	552	D	REDNDT GYRO PICK-OFF	1	A	39	M2.7	2.7	MIN		35													X				X	
	I	552	D	REDNDT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35	●	●	●	●	●	X	●	●	X	X	X	X		X	X	X		OD
	I	552	D	REDNDT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35	●	●	●	●	●	X	●	●	X	X	X	X		X	X	X		OD
	I	1594	D	PENDULUM #1 NULL				M30	30	MA			●	●	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	897
	I	1595	D	PENDULUM #2 NULL				M30	30	MA			●	●	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	897
	I	1596	D	OPTIC SIGNAL				M30	30	MA			●	●	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	897

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / MC	SUBCARRIER / TRACE	CONN PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
I		505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K	●	●	●	●	●	X	●	●	X	X	X	X	X	X	X	X	X	OD
I		1505	H	COMPUTER POSITION X				0	6K	NM		10K	X	X	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
I		506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K	●	●	●	●	●	X	●	●	X	X	X	X	X	X	X	X	X	OD
I		1506	H	COMPUTER POSITION Y				M300	500	NM		10K	X	X	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
I		507	H	~~COMPUTER POSITION Z~~	1	E	G	0	700	NM		10K	●	●	●	●	●	X	●	●	X	X	X	X	X	X	X	X	X	OD
I		1507	H	COMPUTER POSITION Z				0	700	NM		10K	X	X	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
I		508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K	●	●	●	●	●	X	●	●	X	X	X	X	X	X	X	X	Y	OD
I		1508	H	RANGE ERROR FUNCTION				0	6K	NM		10K	X	X	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
I		509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K	●	●	●	●	●	X	●	●	X	X	X	X	X	X	X	X	X	OD
I		1509	H	AZM ERROR FUNCTION				M300	500	NM		10K	X	X	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
I		502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K	●	●	●	●	●	X	●	●	X	X	X	X	X	X	X	X	X	OD
I		1502	L	COMPUTER VELOCITY X				0	22K	F/S		10K	X	X	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
I		503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K	●	●	●	●	●	X	●	●	X	X	X	X	X	X	X	X	X	OD
I		1503	L	COMPUTER VELOCITY Y				0	4K	F/S		10K	X	X	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	
I		504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K	●	●	●	●	●	X	●	●	X	X	X	X	X	X	X	X	X	OD
I		1504	L	~~COMPUTER VELOCITY Z~~				0	6K	F/S		10K	X	X	●	●	●	X	X	X	X	X	X	X	X	X	X	Y	X	OD
I		560	O	~~BINNACLE X AXIS~~	1	C	1	M10	10	G	1	800	X	X																OD
I		560	O	~~CROSS CONNECT THRU~~	1	C	7						X	X																
I		561	O	~~BINNACLE Y AXIS~~	1	C	9	M10	10	G	1	800	X																	OD
I		561	O	~~CROSS CONNECT THRU~~	1	C	15						X																	
I		562	O	BINNACLE Z AXIS	1	C	17	M10	10	G	1	800	X	X																OD
I		562	O	CROSS CONNECT THRU	1	C	23						X	X																
I		564	O	COMPUTER X AXIS	1	C	25	M10	10	G	1	800	X																	541
I		564	O	CROSS CONNECT THRU	1	C	31						X																	
I		565	O	COMPUTER Y AXIS	1	C	33	M10	10	G	1	800	X	X																541
I		565	O	CROSS CONNECT THRU	1	C	39						X	X																
I		566	O	COMPUTER Z AXIS	1	C	41	M10	10	G	1	800	X	X																541
I		566	O	CROSS CONNECT THRU	1	C	47						X	X																
I		572	P	BINNACLE	1	12	15	0	41	PIA		SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		531
I		1607	Q	ASC HETERODYNE FREQ		F		4085	4115	CPS		42C							X		X		X							1815

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VEHICLE	SYSTEM	ELEMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM/SEC	SUBCARRIER/TRACK	COMM PIN/CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	I	531	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO	●	●	●	●	●	X	●	●	X	X	X	X		X	X	X		531
	I	532	T	GYRO 2	1	12	3	M6.3	6.3	DGC		SLO	●	●	●	●	●	X	●	●	X	X	X	X		X	X	X		531
	I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		530
		534	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		531
	~~I~~	~~535~~	~~T~~	~~COMPUTER~~	~~1~~	~~12~~	~~19~~	~~0~~	~~50~~	~~DGC~~		~~SLO~~	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		~~531~~
	·	526	V	YAW STEERING SIG	1	A	45	M3	3	VAC		10												X					X	
	I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10	●	●	●	●	●	X	●	●	X	X	X	X		X	X	X		OD
	I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10	●	●	●	●	●	X	+	●	X	X	X	X		X	X	X		OD
	I	1528	V	YAW STEERING SIG		D		M3	3	VAC		10							X		X		X							1815
	I	529	V	ROLL RESOLVER SIG	1	A	41	M10	10	VAC		6												X					X	
	I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	I	530	V	PITCH RESOLVER SIG	1	A	43	M30	30	VAC		10												X					X	
	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10	●	●	●	●	●	X	●	●	X	X	X	X		X	X	X		OD
	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	V13		10	●	●	●	●	●	X	●	●	X	X	X	X		X	X	X		OD
	~~I~~	~~540~~	~~V~~	~~CONTROL 115 PHASE B~~	~~1~~	~~12~~	~~11~~	~~105~~	~~125~~	~~VAC~~		~~SLO~~	●	●	●	X	●	X	X	●	X	X	X	X		X	X	X		~~531~~
	~~I~~	~~541~~	~~V~~	~~CONTROL M22.5 PSUP~~	~~1~~	~~12~~	~~21~~	~~M25~~	~~M20~~	~~VDC~~		~~SLO~~	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		~~531~~
	~~I~~	~~543~~	~~V~~	~~COMPUTER M50 PSUP~~	~~2~~	~~9~~		~~M55~~	~~M45~~	~~VDC~~		~~SLO~~	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		~~530~~
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M19	M14	VDC		SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		531
	I	545	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		531
	I	547	V	COMPUTER 4 PSUP	1	13	43	0	6	VDC		SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		531
	I	548	V	COMPUTER 38 PSUP	1	12	41	0	76	VDC		SLO	X	X	X	X	X	X	6	X	X	X	X	X		X	X	X		530
	I	580	V	AZM RESOLVER SIG	1	A	15	M7.8	7.8	VAC		40												X					X	
	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40	●	●	●	X	●	X	X	X	X	X	X	X		X	X	X		OD
	I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40	●	●	●	X	●	X	X	X	X	X	X	X		X	X	X		OD
	I	1601	V	400 CPS REFERENCE									X	X	X	●	●	X		X		X		X	X	X	X	X	X	897
	I	1606	V	COMPUTER RESET		0		0	10	VDC	15%		X	X	X	X	X	X		X		X		X	X	X	X	X	X	1493
	I	510	W	ELAPSED TIME	1	E	D	0	450	SEC		10K	●	●	●	●	●	X	●	●	X	X	X	X	X	X	X	X	X	OD
	I	1510	W	ELAPSED TIME				0	450	SEC			X	X	●	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
	I	581	W	TIME T	1	A	15					BLP												X					X	
	I	581	W	TIME T	2	8	S					BLP	X	X	●	X	●	X	X	X	X	X	X	X		X	X	X		OD

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / REC	SUBCARRIER / TRACK	COMM TLM / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	I	521	X	VERN ENGINE COF SIG	1	7	S	OFF	ON			STP													X				X	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	I	521	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	I	1521	X	VERN ENGINE COF SIG				OFF	ON			STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	~~I~~	~~522~~	~~X~~	~~S ENGINE COF SIG~~	~~1~~	~~9~~	~~S~~	~~OFF~~	~~ON~~			~~STP~~													~~X~~				~~X~~	
	I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	I	522	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	I	1522	X	S ENGINE COF SIG				OFF	ON			STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	I	523	X	S&V COF RELAYS	2	10	S	OFF	ON			BLP	●	●	●	X	●	X	X	X	X	X	X	X		X	X	X		OD
	I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP	●	●	●	X	X	X	X	X	X	X	X	X		X	X	X		530
	I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP	●	●	●	X	X	X	X	X	X	X	X	X		X	X	X		530
	I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP	●	●	●	X	X	X	●	X	X	X	X	X		X	X	X		OD
	I	527	X	PRE-ARM RELAY CLOS	1	13	1	OFF	ON			STP													X				X	
	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP	●	●	●	X	●	X	●	X	X	X	X	X		X	X	X		OD
	I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP	●	●	●	X	●	X	●	X	X	X	X	X		X	X	X		OD
	I	570	X	STAGING SIGNAL	1	A	47	OFF	ON			STP													X				X	
	~~I~~	~~1570~~	~~X~~	~~STAGING SIGNAL~~				~~OFF~~	~~ON~~			~~STP~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~OD~~
	~~I~~	~~1603~~	~~X~~	~~WORD GATE FIVE~~				~~OFF~~	~~ON~~			~~STP~~	~~X~~	~~X~~	~~●~~		~~●~~	~~X~~		~~X~~		~~X~~		~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~1815~~
	~~I~~	~~1604~~	~~X~~	~~MULT GATE SIX~~				~~OFF~~	~~ON~~			~~STP~~	~~X~~	~~X~~	~~●~~		~~●~~	~~X~~		~~X~~		~~X~~		~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~1816~~
	~~I~~	~~1605~~	~~X~~	~~112 CPS GATE~~				~~OFF~~	~~ON~~			~~STP~~	~~X~~	~~X~~	~~●~~		~~●~~	~~X~~		~~X~~		~~X~~		~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~1818~~
	L	1446	D	2 INCH MOTION Q1		O		0	5	IN	2%	SLO		X	X	X														1771
	L	1447	D	2 INCH MOTION Q2		O		0	3	IN	2%	SLO		X	X	X														1771
	L	1448	D	2 INCH MOTION Q3		O		0	3	IN	2%	SLO		X	X	X														1771
	L	1449	D	2 INCH MOTION Q4		O		0	3	IN	2%	SLO		X	X	X														1771
	L	1452	P	PORT MANO				0	20	INW	0.2				X					X										1753
	L	1453	P	PORT MANO				0	30	INW	0.2				X					X										1753
	L	1454	P	VENTRI PITOT TUBE S1				0	30	INW	0.2				X					X										1753
	L	1455	P	VENTRI PITOT TUBE S2				0	30	INW	0.2				X					X										1753
	L	1456	P	VENTRI PITOT TUBE S3				0	30	INW	0.2				X					X										1753
	L	1457	P	VENTRI PITOT TUBE S4				0	30	INW	0.2				X					X										1753
	L	1458	P	VENTRI PITOT TUBE S5				0	30	INW	0.2				X					X										1753

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Vehicle / System	Measurement Number	Type Measurement	Description	TLM / REC	Subcarrier / Track	Comm Pin / Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	24 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
L	1462	P	VENTRI PITOT TUBE T1				0	30	INW	0.2				X					X										1753
L	1463	P	VENTRI PITOT TUBE T2				0	30	INW	0.2				X					X										1753
L	1464	P	VENTRI PITOT TUBE T3				0	30	INW	0.2				X					X										1175
L	1465	P	VENTRI PITOT TUBE T4				0	30	INW	0.2				X					X										1753
~~L~~	~~1466~~	~~P~~	~~VENTRI PITOT TUBE T5~~				~~0~~	~~30~~	~~INW~~	~~0.2~~				~~X~~					~~X~~										~~1753~~
L	1450	T	PORT THERM 1				40	60	DGF	.5				X					X										1753
L	1451	T	PORT THERM 2				40	60	DGF	.5				X					X										1753
L	1459	T	PORT THERM 3				40	60	DGF	.5				X					X										1753
L	1460	T	PORT THERM 4				40	60	DGF	.5				X					X										1753
L	1461	T	PORT THERM 5				40	60	DGF	.5				X					X										1753
M	79	A	MSL AXIAL ACCEL FINE	3	5		M.5	0.5	G	.05	20						X	X	X	X	X	X	X		X	X	X		1346
M	143	D	BOOSTER SEPERATION	3	7		0	8	IN	.25	14	X	X	X		X	X												1151
M	5144	V	STROBELIGHT BATTERY									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
M	32	X	CONAX VALVE COMMAND	1	13	37	OFF	ON	VDC		STP													X				X	
M	32	X	CONAX VALVE COMMAND	1	A	25	OFF	ON	VDC		STP	X	X	X	X														
M	32	X	CONAX VALVE COMMAND	1	A	53	OFF	ON	VDC		STP							X	X	X	X	X	X		X	X	X		1810
M	32	X	CONNECTED TO 1 A 23	1	A	53						X																	
M	78	X	STROBE LIGHT OCCUR	1	C	95	OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		894
M	84	X	B STGG LATCH MSW Q1	3	8		OFF	ON				X	X	X	X														1022
M	85	X	B STGG LATCH MSW Q2	3	8		OFF	ON				X	X	X	X														1022
M	86	X	B STGG LATCH MSW Q3	3	8		OFF	ON				X	X	X	X														1022
M	87	X	B STGG LATCH MSW Q4	3	8		OFF	ON				X	X	X	X														1022
M	1090	X	MSL ONE INCH MOTION				OFF	ON				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1032
N	5362	D	36 INCH WATER VALVE									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
N	1517	N	AFSWC POD LANYARD					24	FPS											X		X							1843
N	1310	P	SLUG CH LO2 DISCH		5		0	500	PIG		SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1082

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM REC	SUBCARRIER/TRACK	COMM/CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNIT OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	14 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	N	1314	T	SLUG CH LO2 DISCH		S		M250	M325	DGF		SLO	X	A																OD
	N	1932	T	ARMA POD DUCT TEMP				M57	150	DGF	4	SLO							X	X	X	X	X	X	X	X	X	X	X	1784
	N	1335	X	SLG CH LO2 DISCH VLV		R		ON	OFF			STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	~~N~~	~~1336~~	~~X~~	~~SLG CH LO2 VENT VLV~~		~~R~~		~~ON~~	~~OFF~~			~~STP~~	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	N	1337	X	SLG CH LO2 INLET VLV		R		ON	OFF			STP		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	N	1338	X	SLG CH LN2 INLET VLV		R		ON	OFF			TP	X	X	X	X	X	X												
	N	1339	X	SLG CH GN2 INLET VLV		R		ON	OFF			STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	N	1356	X	SLG CH LOX LOW LEVEL		R		ON	OFF			STP	X	X	X		X	X		X		X		X	X	X	X	X	X	1445
	N	1932	X	LOX TPNG VLV CLOSED		R		ON	OFF			P	X	X	X		X	X		X		X		X	X	X	X	X	X	1445
	N	1933	X	LOX TPNG VLV OPEN		R		ON	OFF			STP	X	X	X		X	X		X		X		X	X	X	X	X	X	1445
	N	1979	X	PRESS VLV CLOSED		R		ON	OFF			STP	X	X	X		X	X		X		X		X	X	X	X	X	X	1445
	P	799	A	LO2 LINE LAT ACCEL	2	13		M60	60	G	3%	100				X														950
	P	83	B	O2 PUMP SPEED	1	2		5680	6400	RPM	60	SLO	@	@	@	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	~~P~~	~~1083~~	~~B~~	~~B2 PUMP SPEED~~		~~A~~		~~5650~~	~~6400~~	~~RPM~~	~~60~~	~~SLO~~				X														~~1272~~
	~~P~~	~~84~~	~~B~~	~~B1 PUMP SPEED~~	~~1~~	~~11~~	~~15~~	~~5680~~	~~6400~~	~~RPM~~	~~60~~	~~SLO~~													X				X	
	~~P~~	~~84~~	~~B~~	~~CONNECTED TO 1 11 15~~	~~1~~	~~11~~	~~45~~																		X				X	
	~~P~~	~~84~~	~~B~~	~~B1 PUMP SPEED~~	~~3~~	~~2~~		~~5680~~	~~6400~~	~~RPM~~	~~60~~	~~SLO~~	@	@	@	X	X	X	X	X	X	X	X	X		X	X	X		~~OD~~
	P	1084	B	B1 PUMP SPEED		A		5680	6400	RPM	60	SLO				X														1272
	P	5247	B	PUMP LC SPEED		M		0	100	PCT			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	P	349	B	S PUMP SPEED	1	3		9.9	11.2	KPM	.1	SLO	@	@	@	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	P	1349	B	S PUMP SPEED		A		9.9	11.2	KPM	.1	SLO				X														1272
	P	529	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG	2	SLO	@	X	X	X	X	X	X	X	X	X								1374
	P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG	2	SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	P	529	D	S MAIN LOX VLV	1	1	45	0	90	DEG	2	SLO													X				X	
	P	5685	M	FUEL IN MISSILE		M		0	9999	GAL		SLO	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	
	P	1206	O	S ENG LO2 DOME		F		M80	80	G	4	2KC									X	X	X	X	X	X				1788
	P	1208	O	B1 ENG LO2 DOME		F		M80	80	G	4	2KC									X	X	X	X	X	X				1788

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / SEC	SUBCARRIER / TRACK	COMM PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	34 / 17	40 / 19	
	P	1209	O	B2 ENG LO2 DOME		F		M80	80	G	4	2KC									X	X	X	X	X	X				1788
	P	1439	O	S NAA RCC ACCEL	2	9		M80	80	G	5	HAP	@																	
	P	1439	O	S NAA RCC ACCEL		F		M80	80	G	5	2KC		X		X														1692
	P	1452	O	B1 NAA RCC ACCEL	2	11		M80	80	G	5	HAP	@																	
	P	1452	O	B1 NAA RCC ACCEL		F		M80	80	G	5	2KC		X			X	X												1692
	P	1453	O	B2 NAA RCC ACCEL	2	13		M80	80	G	5	HAP	@																	
	P	1453	O	B2 NAA RCC ACCEL		F		M80	80	G	5	2KC		X			X	X												1692
	P	1001	P	B1 LO2 PUMP INLET		O		0	100	PIG	1	SLO	@																	
	P	1001	P	B1 LO2 PUMP INLET		F		0	300	PIA	15	1KC									X	X	X	X	X	X				1788
	P	1002	P	B1 FUEL PUMP INLET		O		0	100	PIG	1	SLO	@																	
	P	1002	P	B1 FUEL PUMP INLET		F		0	300	PIA	15	1KC									X	X	X	X	X	X				1788
	P	1003	P	B2 LO2 PUMP INLET		O		0	100	PIG	1	SLO	@																	
	P	1003	P	B2 LO2 PUMP INLET		F		0	300	PIA	15	1KC									X	X	X	X	X	X				1788
	P	1004	P	B2 FUEL PUMP INLET		O		0	100	PIG	1	SLO	@																	
	P	1004	P	B2 FUEL PUMP INLET		F		0	300	PIA	15	1KC									X	X	X	X	X	X				1788
	P	6	P	S THRUST CHAMBER	1	A	51	0	1000	PIA	16	150													X				X	
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA	16	150	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	P	6	P	CROSS CONNECT	2	E	31						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	P	1010	P	B1 LUBE OIL INJ MAN		S		0	1000	PIA	50	SLO	X	X																778
	P	1011	P	B2 LUBE OIL INJ MAN		S		0	1000	PIA	50	SLO	X	X																778
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA	40	SLO	X				X	X	X	X	X	X	X	X		X	X	X		OD
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA	10	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA	10	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA	40	SLO	X			X	X	X	X	X	X	X	X	X		X	X	X		D
	P	36	P	B2 FUEL PUMP DISCH	1	A	3	0	1000	PIA	40	SLO													X				X	
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA	40	SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	P	38	P	CONNECTED TO 2 E 23	2	E	53						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	P	39	P	B2 FUEL PUMP DISCH	1	A	21	0	1000	PIA	40	SLO													X				X	
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	PIA	40	SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	P	39	P	CONNECTED TO 2 E 21	2	E	51						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA	3.8	SLO	@	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	P	59	P	B2 THRUST CHAMBER	1	C	7	0	800	PIA	18	60													X				X	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / ESC	SUBCARRIER / TRACK	COMM PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	P	59	P	CONNECTED TO 1 C 7	1	C	37																		X				X	
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	800	PIA	18	60	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	P	59	P	CONNECTED TO 2 E 11	2	E	41						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	P	60	P	B1 THRUST CHAMBER	1	C	5	0	800	PIA	18	60													X				X	
	P	60	P	CONNECTED TO 1 C 5	1	C	35																		X				X	
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	800	PIA	18	60	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	P	60	P	CONNECTED TO 2 E 9	2	E	39						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA	15	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	P	1091	P	B1 LO2 INJ MANIFOLD		F		0	1500	PIA	75	1KC									X	X	X	X	X	X				1788
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA	15	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	P	1092	P	B2 LO2 INJ MANIFOLD		F		0	1500	PIA	75	1KC									X	X	X	X	X	X				1788
	P	1093	P	B1 FUEL INJ MANIFOLD		F		0	1500	PIA	75	1KC									X	X	X	X	X	X				1788
	P	1094	P	B2 FUEL INJ MANIFOLD		F		0	1500	PIA	75	1KC									X	X	X	X	X	X				1788
	P	155	P	B1 GAS GEN COMBUSTOR	1	12	23	0	1000	PIA	30	SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		1270
	P	155	P	B1 GAS GEN COMBUSTOR	1	13	41	0	1000	PIA	30	SLO													X				X	
	P	184	P	B2 GAS GEN COMBUSTOR	1	12	33	0	1000	PIA	30	SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		1270
	P	186	P	S2 GAS GEN COMBUSTOR	1	13	43	0	1000	PIA	30	SLO													X				X	
	P	185	P	B1 TURBOPUMP GEARBOX	2	11	49	0	15	PIG	.5	SLO	X		X															1272
	P	182	P	B2 TURBOPUMP GEARBOX	2	11	51	0	15	PIG	.5	SLO	X		X															1272
	P	1232	P	S LO2 SEAL CAVITY		S		0	40	PIG	2	SLO	X	X																999
	P	279	F	B2 LO PR LUB OIL MAN	1	11	11	0	125	PIA	5	SLO													X				X	
	P	279	P	B2 LO PR LUB OIL MAN	2	11	43	0	125	PIA	5	SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		1272
	P	330	P	S FUEL PUMP DISCH	1	13	33	0	1500	PIA	38	SLO								X	X	X	X	X		X	X	X		1756
	P	330	P	S FUEL PUMP DISCH	1	A	49	0	1500	PIA	38	SLO													X				X	
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA	38	SLO	X	X	X	X	X	X	X											OD
	P	330	P	CONNECTED TO 2 E 3	2	E	33						X	X	X	X	X	X	X											
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA	25	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	P	341	P	S LUBE OIL MANIFOLD	1	11	1	0	1500	PIA	38	SLO													X				X	
	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1500	PIA	38	SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		1272
	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA	15	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	P	5373	P	LO2 STORAGE TANK		M		0	50	PIG	.6	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	P	1419	P	B1 GG LOX INJ MAN		O		0	1000	PIA	20	1K	X																	1449
	P	1420	P	B2 GG LOX INJ MAN		O		0	1000	PIA	20	1K	X																	1449

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / REC	SUBCARRIER / TRACK	COMM PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	P	5430	P	FUEL STORAGE TANK		M		0	10	PIG	.6	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	P	1465	[illegible]	S LO PR LUBE OIL MAN		S		0	400	PIG	2	SLO	X	X																778
	P	473	P	B1 LO PR LUB OIL MAN	1	11	13	0	150	PIA	5	SLO												X					X	
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	150	PIA	5	SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		1272
	~~P~~	~~474~~	~~P~~	~~V CTL PRESS REG OUT~~	~~1~~	~~A~~	~~15~~	~~0~~	~~1000~~	~~PIA~~	~~40~~	~~SLO~~	~~X~~	~~X~~																~~445~~
	P	1474	P	V CTL PRESS REG OUT		S		200	800	PIA	16	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	P	1020	T	B1 LO2 PUMP INLET		S		M325	M275	DGF	1	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1450
	P	1054	T	B2 LOX PUMP INLET		S		M325	M275	DGF	1	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1450
	P	1151	T	FUEL TK @ STA 1043		S		0	200	DGF	5	SLO	●																	1270
	P	1325	T	ENG COMP AMBIENT		S		M325	500	DGF	3	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	643
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	●	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	P	671	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	P	709	T	SGG COMBUSTOR	1	11	23	0	1500	DGF	38	SLO												X					X	
	P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF	38	SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		1291
	P	1710	T	SE ENVIRONMENT		S		M325	500	DGF		SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	643
	~~P~~	~~1711~~	~~T~~	~~B1 NACELLE AMBIENT~~		~~S~~		~~M325~~	~~500~~	~~DGF~~		~~SLO~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~643~~
	~~P~~	~~1712~~	~~T~~	~~B2 NACELLE AMBIENT~~		~~S~~		~~M325~~	~~500~~	~~DGF~~		~~SLO~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~643~~
	~~P~~	~~713~~	~~T~~	~~B1 GAS GEN COMBUSTOR~~	~~1~~	~~11~~	~~19~~	~~0~~	~~1500~~	~~DGF~~	~~42~~	~~SLO~~												~~X~~					~~X~~	
	~~P~~	~~713~~	~~T~~	~~B1 GAS GEN COMBUSTOR~~	~~3~~	~~11~~	~~5~~	~~0~~	~~1500~~	~~DGF~~	~~42~~	~~SLO~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		~~X~~	~~X~~	~~X~~		~~1291~~
	~~P~~	~~714~~	~~T~~	~~B2 GAS GEN COMBUSTOR~~	~~1~~	~~11~~	~~41~~	~~0~~	~~1500~~	~~DGF~~	~~42~~	~~SLO~~												~~X~~					~~X~~	
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF	42	SLO	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		1291
	P	5849	W	LO2 SLUG XFER & FIRE		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	P	1155	X	OBSERVER CUTOFF		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	535
	P	1161	X	TCC START SWITCH		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	535
	P	1164	X	TCC ENGINE COF SW		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	535
	P	1225	X	ENGINE CONTROL READY		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1403
	P	1226	X	PNEUMATICS CUTOFF		R		OFF	ON	VDC		STP	X	X		X														1403
	P	1227	X	LOX DOME PURGE		R		OFF	ON	VDC		STP	X	X		X														1403
	P	1228	X	IGNITER FUEL PURGE		R		OFF	ON	VDC		STP	X	X		X														1403
	P	1229	X	LOX HIGH TOPPING		R		OFF	[illegible]	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1415

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / REC	SUBCARRIER / TRACK	COMM / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	P	1230	X	LOX LOW TOPPING		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1415
	P	1231	X	LOX 100% SLUG COM		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1415
	P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	P	1347	X	S CUTOFF RELAY		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	P	1544	X	VERNIER CONTROL		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	535
	P	1545	X	S IGN STAGE CONTROL		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	535
	P	1546	X	B2 CUTOFF RELAY		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	535
	P	547	X	B1 CUTOFF RELAY	1	7	S	0	28	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	535
	P	1547	X	B1 CUTOFF RELAY		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	P	540	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	535
	P	1548	X	COMPLETE COF RELAY		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	P	1549	X	IGNITION START		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	535
	P	1598	X	VERNIER CUTOFF RELAY		R		OFF	ON	VDC		STP				X														1468
	P	1688	X	VERNIER ENG PURGE		R		OFF	ON	VDC		STP				X														1466
	P	1785	X	B SECONDARY SHUTDOWN		R		OFF	ON	VDC		STP	X	X		X														1322
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG	.2	15	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	61	D	CONNECTED TO 1 A 9	1	A	39						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG	.2	15	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	62	D	CONNECTED TO 1 A 11	1	A	41						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG	.2	15	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	63	D	CROSS CONNECT	1	A	43						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG	.5	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	419
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG	.5	30	X	X	X	X	X	X												419
	S	204	D	B2 PITCH ROLL	1	C	11	M5	5	DEG	.5	30													X				X	
	S	204	D	CONNECTED TO 1 C 11	1	C	41																		X				X	
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG	.5	30	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD
	S	204	D	CONNECTED TO 2 E 15	2	E	45						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	S	205	D	B1 YAW	1	6		M5	5	DEG	.5	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	419
	S	205	D	B1 YAW	2	11	5	M5	5	DEG	.5	30	X	X	X	X	X	X												419
	S	206	D	B2 YAW	1	C	15	M5	5	DEG	.5	30													X				X	
	S	206	D	CONNECTED TO 1 C 15	1	C	45																		X				X	
	S	206	D	B2 YAW	2	E	19	M5	5	DEG	.5	30	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		OD

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / REC	SUBCARRIER / TRACK	COMM PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4	8	9	12	13	16	17	18	21	22	25	26	30	32	34	36	40	
													2	3	4	5		7	8	9	10	11	12	13	14	15	16	17	19	
	S	206	D	CONNECTED TO 2 E 19	2	E	49						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	S	222	D	V1 PITCH	1	C	23	0	50	DEG	5%	10													X				X	
	S	222	D	CONNECTED TO 1 C 23	1	C	53																		X				X	
	S	222	D	V1 PITCH	2	E	7	0	50	DEG	5%	10	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		419
	~~S~~	~~222~~	~~D~~	~~CONNECTED TO 2 E 7~~	~~2~~	~~E~~	~~37~~						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	S	223	D	V2 PITCH	1	C	1	0	50	DEG	5%	10													X				X	
	S	223	D	CONNECTED TO 1 C 1	1	C	31																		X				X	
	S	223	D	V2 PITCH	2	E	5	0	50	DEG	5%	10	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		419
	S	223	D	CONNECTED TO 2 E 5	2	E	35						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	S	233	D	V1 YAW ROLL	1	C	9	M70	70	DEG	7	10													X				X	
	S	233	D	CONNECTED TO 1 C 9	1	C	39																		X				X	
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG	7	10	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		419
	S	233	D	CONNECTED TO 2 E 13	2	E	43						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	S	234	D	V2 YAW ROLL	1	C	13	M70	70	DEG	7	10													X				X	
	S	234	D	CONNECTED TO 1 C 13	1	C	43																		X				X	
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG	7	10	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		419
	~~S~~	~~234~~	~~D~~	~~CONNECTED TO 2 E 17~~	~~2~~	~~E~~	~~47~~						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		
	~~S~~	~~256~~	~~D~~	~~SUSTAINER YAW~~	~~1~~	~~4~~		~~M3.0~~	~~3.0~~	~~DEG~~	~~.3~~	~~30~~	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	419
	~~S~~	~~256~~	~~D~~	~~SUSTAINER YAW~~	~~2~~	~~11~~	~~1~~	~~M3.0~~	~~3.0~~	~~DEG~~	~~.3~~	~~30~~	X	X	X	X	X	X												419
	~~S~~	~~257~~	~~D~~	~~SUSTAINER PITCH~~	~~1~~	~~5~~		~~M3.0~~	~~3.0~~	~~DEG~~	~~.3~~	~~30~~	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	419
	S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG	.3	30	X	X	X	X	X	X												419
	S	5358	D	ROLL PROGRAM READ[illegible]		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S	.3	15	●	X	X	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S	.3	15	●	X	X	●	●	X	X	X	X	X	X	X		X	X	X		OD
	S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S	.3	15	●	X	X	●	●	X	X	X	X	X	X	X		X	X	X		OD
	S	53	R	PITCH RATE GYRO SIG	1	A	23	M6	6	D/S	.3	15													X				X	
	S	53	R	CONNECTED TO 1 A 23	1	A	53																		X				X	
	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S	.3	15	●	X	X	●	●	X	X	X	X	X	X	X		X	X	X		OD
	S	54	R	YAW RATE GYRO SIG	1	8		M6	6	D/S	.3	15	●	X	X	●	●	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S	.3	15	●	X	X	●	●	X	X	X	X	X	X	X		X	X	X		OD
	S	1048	V	PROGRAMMER PITCH SIG		D		0	2.7	VAC	.2	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / RSC	SUBCARRIER / TRACK	COMM PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	S	1107	V	B1 PCH ACTR FEEDBACK		D		M12	12	VAC	5%	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1108	V	B2 PCH ACTR FEEDBACK		D		M12	12	VAC	5%	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1113	V	V1 YAW ACTR FEEDBACK		D		M5	7	VAC	5%	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1114	V	V2 YAW ACTR FEEDBACK		D		M5	7	VAC	5%	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1118	V	V2 PCH ACTR FEEDBACK		D		M11	11	VAC	5%	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1119	V	V1 PCH ACTR FEEDBACK		D		M11	11	VAC	5%	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1121	V	GRYO TEST SIG		D		M5	5	VAC	5%	STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1122	V	SERVO TEST SIG		D		M11	11	VAC	5%	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1128	V	B1 YAW ACTR FEEDBACK		D		M11	11	VAC	5%	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1129	V	B2 YAW ACTR FEEDBACK		D		M12	12	VAC	5%	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1147	V	PITCH GYRO AMP OUT		D		M10	10	VAC	1	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1148	V	YAW GYRO AMP OUT		D		M10	10	VAC	1	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1149	V	ROLL GYRO AMP OUT		D		M10	10	VAC	1	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1216	V	S PCH ACTR FEEDBACK		D		M10	10	VAC	1	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	1217	V	S YAW ACTR FEEDBACK		D		M10	10	VAC	1	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	5270	V	FINE HEATER-PITCH		M		0	150	VAC			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	S	5271	V	FINE HEATER-YAW		M		0	150	VAC			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	S	5272	V	FINE HEATER-ROLL		M		0	150	VAC			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	S	385	V	ACCEL 400 CYCLE CONT	1	11	1	0	11	VAC		1						X												1727
	S	385	V	ACCEL 400 CYCLE CONT	1	11	11	0	11	VAC		2.5					X													1590
	S	385	V	ACCEL 400 CYCLE CONT	1	11	31	0	11	VAC		1									X									1798
	S	5176	W	PROGRAM RUN TIME		M		0	999	SEC			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	S	5282	W	DECADE EVENT TIMER		M		0	10K	SEC			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	S	151	X	TANK FRAG DESTRUCT	1	13	19	OFF	ON																X				X	
	S	151	X	TANK FRAG DESTRUCT	3	7	S	OFF	ON											X							X	X		1380
	S	1235	X	PROGRAMMER RUN TIME		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	S	248	X	A/P PG SWITCH 17	1	13	3	OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	775
	S	359	X	BOOSTER STAGING B/U	1	A	3	OFF	ON	VDC	.1	2.5						X			X									1798
	S	359	X	BOOSTER STAGING B/U	1	A	53	OFF	ON	VDC	.1	2.5					X													1590
	S	1370	X	STAGING		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1372
	S	1371	X	BOOSTER JETTISON		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1372

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / RSC	SUBCARRIER / TRACK	COMM PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	S	1372	X	PRESSURIZE VERN TANK		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1372
	S	373	X	BOOSTER CUTOFF	2	11	1	OFF	ON	VDC		STP							X	X	X	X	X	X		X	X	X		1810
	S	1373	X	BOOSTER CUTOFF		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1372
	S	374	X	SUSTAINER CUTOFF	2	11	5	OFF	ON	VDC		STP							X	X	X	X	X	X		X	X	X		1810
	~~S~~	~~1374~~	~~X~~	~~SUSTAINER CUTOFF~~		~~R~~		~~OFF~~	~~ON~~	~~VDC~~		~~STP~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~1372~~
	S	1375	X	VSHPS BACK-UP SIGNAL		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1372
	S	376	X	VERNIER CUTOFF	2	11	7	OFF	ON	VDC		STP							X	X	X	X	X	X		X	X	X		1810
	S	1376	X	VERNIER CUTOFF		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1372
	S	1377	X	EJECT RV UMBILICAL		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1372
	S	1378	X	RV JETTISON		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1372
	S	379	X	FIRE RETROROCKETS	2	11	3	OFF	ON	VDC		STP							X	X	X	X	X	X		X	X	X		1810
	S	1379	X	FIRE RETROROCKETS		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1372
	S	391	X	THOR RETROROCKET CMD	1	11	43	OFF	ON	VDC		STP													X				X	
	S	391	X	THOR RETROROCKET CMD	1	13	35	OFF	ON	VDC		STP								X							X	X		1810
	T	2	T	B1 T/C REFER JUNCT	1	11	1	0	200	DGF	8	SLO				X														1717
	~~T~~	~~2~~	~~T~~	~~B1 T/C REFER JUNCT~~	~~1~~	~~11~~	~~1~~	~~0~~	~~200~~	~~DGF~~	~~8~~	~~SLO~~			~~X~~															~~1672~~
	~~T~~	~~2~~	~~T~~	~~B1 T/C REFER JUNCT~~	~~1~~	~~11~~	[illegible]	~~0~~	~~200~~	~~DGF~~	~~8~~	~~SLO~~	~~X~~	~~X~~																~~OD~~
	~~T~~	~~3~~	~~T~~	~~S T/C REFER JUNCT~~	~~1~~	~~11~~	~~23~~	[illegible]	~~200~~	~~DGF~~	~~8~~	~~SLO~~	~~X~~	~~X~~	~~X~~															~~1672~~
	~~T~~	~~3~~	~~T~~	~~S T/C REFER JUNCT~~	~~1~~	~~11~~	~~39~~	~~0~~	~~200~~	~~DGF~~	~~8~~	~~SLO~~				~~X~~														~~1717~~
	T	4	T	ARMA T/C REF JUNCT	1	11	23	0	200	DGF	8	SLO						X	X	X										
	T	103	T	BOOSTER T/C REF JUNC	1	11	1	0	200	DGF	4%	SLO		●																1583
	T	103	T	BOOSTER T/C REF JUNC	1	11	19	0	200	DGF	4%	SLO			X	X	X	X	X											1717
	T	104	T	POD 2 T/C REF JUNCT	1	11	23	0	200	DGF	8	SLO									X	X	X							
	T	105	T	POD 1 T/C REF JUNCT	1	11	19	0	200	DGF	8	SLO								X	X	X	X							1810
	T	162	T	V T/C REFER JUNCT	1	11	23	0	200	DGF	8	SLO				X	X													1717
	T	162	T	V T/C REFER JUNCT	1	11	43	0	200	DGF	8	SLO			X															1672
	T	5140	V	TLM #1 BAT DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5141	V	TLM #1 EXTERNAL DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5144	V	TLM #2 BAT DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5145	V	TLM #2 EXTERNAL DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5146	V	TLM #3 BAT DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

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Vehicle	System	Measurement Number	Type Measurement	Description	TLM / REC	Subcarrier / Track	Comm / PAM / Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	26 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	T	5147	V	TLM #3 EXTERNAL DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5156	V	TLM 1 FIL INT DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5157	V	TLM 1 FIL EXT DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5158	V	TLM 2 FIL INT DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5159	V	TLM 2 FIL EXT DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5160	V	TLM 3 FIL INT DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5161	V	TLM 3 FIL EXT DC		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5150	W	TLM #1 TOTAL TIMER		M		0	1000	HR			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5151	W	TLM #2 TOTAL TIMER		M		0	1000	HR			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5152	W	TLM #3 TOTAL TIMER		M		0	1000	HR			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5153	W	TLM #1 BAT TIMER		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5154	W	TLM #2 BAT TIMER		M							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	T	5155	W	TLM #3 BAT TIMER		M		0	60	MIN			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	U	101	A	AXIAL ACCELERATION	1	12	0	0	8	G		CON													X				X	
	~~U~~	~~107~~	~~C~~	~~PU SV AMP OUT~~	~~3~~	~~11~~	~~29~~	~~M6~~	~~6~~	~~MA~~	~~.4~~	~~SLO~~							X	X	X	X								~~1810~~
	~~U~~	~~107~~	~~C~~	~~PU SV AMP OUT~~	~~3~~	~~11~~	~~41~~	~~M6~~	~~6~~	~~MA~~	~~.4~~	~~SLO~~				X														~~1810~~
	~~U~~	~~1107~~	~~C~~	~~PU SV AMP OUT~~		~~D~~		~~M6~~	~~6~~	~~MA~~	~~.4~~	~~SLO~~				X			X	X	X	X								~~1810~~
	U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID	.5	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID	.5	SLO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	U	91	V	ERROR RATIC DEMOD OP	1	A	7	M5	5	VDC	.5	SLO	●	X	X	X	X	X	X	X	X	X								466
	U	91	V	CONNECTED TO 1 A 7	1	A	37						●	X	X	X	X	X	X	X	X	X								
	U	1091	V	ERROR RATIO DEMOD OP		S		M20	20	VDC	.5	20	X	X	X	X	X	X	X	X	X	X								
	U	112	V	AA COUNTER OP	3	8		0	5	VDC	5%	.01											X	X		X	X	X		1640
	U	113	V	AA VALVE POS FB	1	13	13	0	5	VDC	5%	.1													X				X	
	U	113	V	AA VALVE POS FB	1	A	45	0	5	VDC	5%	.1											X							1640
	U	113	V	AA VALVE POS FB	1	A	49	0	5	VDC	5%	.1												X	X	X	X	X		1374
	U	409	V	PU VALVE COMMND VOLT	3	11	29	M.6	.6	VDC		SLO						X												1765
	U	132	X	AA STA COUNTER OTP	2	11	39	0	5	VDC	5%	SLO											X	X		X	X	X		1640

REPORT NO. E-RED COMPOSITE — DATE 15 MAY 61 — PAGE 29

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / REC	SUBCARRIER / TRACK	COMM PIN / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 2	8 3	9 4	12 5	13 6	16 7	17 8	18 9	21 10	22 11	25 12	26 13	30 [illegible]	32 15	35 16	36 17	40 19	
	U	133	X	AA SCHMITT TRIGGER	1	A	15	0	5	VDC	10%	.1											X	X		X	X	X		1640
	U	134	X	AA TIME SHARD OSC OP	1	A	3	0	5	VDC	10%	.1											X	X		X	X	X		1640
	U	135	X	AA SENSORS SIG	1	A	7	0	5	VDC	10%	.05											X		X				X	1640
	U	135	X	AA SENSORS SIG	1	A	21	0	5	VDC	10%	.05												X		X	X	X		1374
	U	135	X	CONNECTED TO 1 A 7	1	A	37																X		X				X	1640
	U	135	X	CONNECTED TO 1 A 21	1	A	51																	X		X	X	X		1374
	U	1200	X	LOX 100% SLUG COF-1		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	789
	U	1201	X	LOX TOPG HI CTL-1		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	789
	U	1202	X	LOX TOPG LO CTL-1		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	789
	U	1203	X	LOX 95% RAPID LOAD-1		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	799
	U	1204	X	FUEL 100% SEC CTL		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	789
	U	1205	X	FUEL 100% PRI CTL		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	789
	U	1206	X	FUEL 95% SEC CTL		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	789
	U	1207	X	FUEL 95% PRI CTL		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	789
	U	1208	X	LOX 100% SLUG COF-2		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1274
	U	1209	X	LOX TOPG HI CTL-2		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1274
	U	1210	X	LOX TOPG LO CTL-2		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1274
	U	1211	X	LOX 95% RAPID LOAD 2		R		OFF	ON	VDC		STP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1274
	Y	102	L	EJECTION VELOCITY	2	F	75	0	100	FPS		1							X	X	X					X	X			1643
	Y	102	L	EJECTION VELOCITY	3	12	11	0	100	FPS		1									X									1214
	Y	158	T	TEMP B IN FAIRING	3	12	13												X	X						X	X			1643
	Y	159	T	TEMP C IN FAIRING	3	12	15												X	X						X	X			1643
	Y	160	T	TEMP D IN FAIRING	3	12	17												X	X						X	X			1643
	Y	161	T	TEMP A IN FAIRING	3	12	19												X	X						X	X			1643
	Y	156	V	BATTERY VOLTAGE	3	12	9	0	6	VDC									X	X	X					X	X			1643
	Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP	X	X		X	X			X	X	X	X	X	X	X	X	X	X	1108
	Y	103	X	BAROSWITCH	3	12	1	ON	OFF										X	X	X					X	X			1643
	Y	104	X	TIMER START	3	12	1	ON	OFF			1							X	X	X					X	X			1643
	Y	105	X	BOOSTER ACCEL CYCLE	3	12	1	ON	OFF			1							X	X	X					X	X			1643

CONFIDENTIAL

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TLM / SEC	SUBCARRIER / TRACE	COMM PM / CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	4 / 2	8 / 3	9 / 4	12 / 5	13 / 6	16 / 7	17 / 8	18 / 9	21 / 10	22 / 11	25 / 12	28 / 13	30 / 14	32 / 15	35 / 16	36 / 17	40 / 19	
	Y	106	X	SUSTAINER HALF CYCLE	3	12	1	ON	OFF			1								X	X	X					X	X		1643
	Y	141	X	EJECT SURE	2	E	85	ON	OFF			8								X	X	X					X	X		1643
	Y	141	X	EJECT SURE	3	12	11	ON	OFF			8										X								1214
	Y	150	X	FAIRING RELEASE SIG	3	12	3	ON	OFF											X	X	X					X	X		1643
	~~Y~~	~~151~~	~~X~~	~~UNLATCH SIGNAL~~	~~3~~	~~12~~	~~3~~	~~ON~~	~~OFF~~											~~X~~	~~X~~	~~X~~					~~X~~	~~X~~		~~1643~~
	Y	152	X	MOTOR START SIGNAL	3	12	3	ON	OFF											X	X	X					X	X		1643
	Y	153	X	EJECT SIGNAL	3	12	3	ON	OFF											X	X	X					X	X		1643
	Y	154	X	TUBE ORIENTATION	3	12	5	ON	OFF											X	X	X					X	X		1643
	Y	155	X	TUBE UNLATCH	3	12	7	ON	OFF											X	X	X					X	X		1643
	Z	2	E	KLYSTRON PWR OUTPUT	1	11	1	0	12	E	5*	SLO	X																	OD
	Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM	5*	3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	OD
	Z	3	E	CONNECTED TO 1 A 17	1	A	47						X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		

SECTION 9

E FLIGHT OBJECTIVE COMPOSITE

This section presents a grouping of the measurements which support each test objective presently scheduled for the E Flight Program.

OBJECTIVE CODE

This code provides a means of grouping the measurements under the objective header (IBM sorting).

MISSILE AREA HEADER

This is a brief, usually abbreviated, description of the missile system area.

OBJECTIVE HEADER

This is the description of the test objective.

MISSILE ALLOCATION

These numbers are the "E" Series number of each of the E Flight missiles shown.

			3	4	8	9	12	13	16	17
HD55	HYDRAULIC SYSTEM									
	OBTAIN DATA FOR HYDRAULIC SYSTEM RELIABILITY ANALYSIS		2	2	2	2	2	2	2	2
	H140P	S/VERN HYD PRESS	O	O	O	O	O	O	O	O

MEASUREMENT NUMBER

OBJECTIVE ALLOCATIONS

A number under the missile number indicate the missile for which the objective is effective. A "1" indicates a primary objective and a "2" indicates a secondary objective.

MEASUREMENT ALLOCATIONS

The letter under the missile numbers indicate the missile on which the measurement is instrumented.

MEASUREMENT DESCRIPTION

This is a brief usually abbreviated, description of the measurement.

NOTE: For a more detailed explanation of this format and a Key to the abbreviations and coding see Appendix A.

FLIGHT OBJ. COMPOSITE 15 MAY 61 . . . 26 30 32 35 36 40 001

OBJ. CODE	DESCRIPTION COMPLEX NUMBER EID 27-0011-	13 1	13 2	13 3	13 4	11 5	13 6	13 7	11 8	13 9	11 10	13 11	13 12	13 13	13 14	13 15	13 16	13 17	13 19
	WEAPON SYSTEM																		
WE52	EVALUATE WEAPON SYSTEM PERFORMANCE OVER INTERMEDIATE RANGE.	1	1	1		1				1	1		1	1		1		1	
	X 9158 A MSL XYZ	0	0	0		0				0	0		0	0		0		0	
	X 9128 H MSL XYZ VS TIME	0	0	0		0				0	0		0	0		0		0	
	X 9152 H AZUSA IMPACT POINT	0	0	0		0				0	0		0	0		0		0	
	X 9192 H MILS IMPACT POINT	0	0	0		0				0	0		0	0		0		0	
	X 9156 L MSL XYZ & RESULTANT	0	0	0		0				0	0		0	0		0		0	
WE54	EVALUATE WEAPON SYSTEM PERFORMANCE OVER MAXIMUM RANGE.						1	1				1			1		1		1
	X 9158 A MSL XYZ						0	0				0			0		0		0
	X 9128 H MSL XYZ VS TIME						0	0				0			0		0		0
	X 9152 H AZUSA IMPACT POINT						0	0				0			0		C		0
	X 9156 L MSL XYZ & RESULTANT						0	0				0			0		0		0
WE58	DEMONSTRATE COMPATABILITY OF ALL MISSILE SYSTEMS	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	X 0000 X NO SPECIFIC INSTR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WE59	EVALUATE WEAPON SYSTEM PERFORMANCE OVER MORE THAN SPECIFIED RANGE.				1				1										
	X 9158 A MSL XYZ				0				0										
	X 9128 H MSL XYZ VS TIME				0				0										
	X 9152 H AZUSA IMPACT POINT				0				0										
	X 9156 L MSL XYZ & RESULTANT				C				0										
WE60	EVALUATE WEAPON SYSTEM PERFORMANCE WITH LOFTED TRAJCTRY													1				1	1
	X 9158 A MSL XYZ													0				0	0
	X 9128 H MSL XYZ VS TIME													0				0	0
	X 9156 L MSL XYZ & RESULTANT													0				0	0
WE61	EVALUATE WEAPON SYSTEM PERFORMANCE OVER MAXIMUM RANGE WITH STRIPPED MISSILE.														1				1
	X 0000 X NO SPECIFIC INSTR.														0				0

E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	3	35	36	40	002
WE62 EVALUATE WEAPON SYSTEM PERFORMANCE WITH FLAT TRAJECTORY						1	1				1								
X 0000 X NO SPECIFIC INSTR.						0	0				0								
WE63 EVALUATE WEAPON SYSTEM PERFORMANCE WITH FLAT MAX-HEATING TRAJECTORY.														1					
X 0000 X NO SPECIFIC INSTR.														0					
MISSILE STRUCTURE SYSTEM																			
AE51 OBTAIN DATA FOR ANALYSIS OF MISSILE STRUCTURE SYSTEM PERFORMANCE REPEATABILITY.	1	1	1	1	1	[illegible]	2	2	2	2	2	2	2	2	2	2	2	2	
F 1 P LO2 TANK HELIUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F 3 P FUEL TANK HELIUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
I 513 A ACCEL XF1 DIRECT	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
I 514 A ACCEL XF2 DIRECT	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
I 516 A ACCELEROMETER YF1	0	0	0	0	0	0	0	0	0	0	C	0	0		0	0	0		
I 517 A ACCELEROMETER ZF1	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
I 519 A ACCELEROMETER YF2	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
I 520 A ACCELEROMETER ZF2	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
M 143 D BOOSTER SEPARATION	0	0	0	0		0	0												
AE53 OBTAIN DATA ON AERODYNAMIC &/OR ENVIRONMENTAL HEATING FOR SELECTED LOCATIONS	2	2	1	1	2	2	2	2	2	2	2	2	2				2		
A 5 P V2 CLAMSHELL INNER				0	0														
A 18 P DUMMY ROD HYD R					0														
A 1 T V2 FAIRING AMBIENT				0	0	0													
A 2 T V-2 CLAMSHELL AMB				0	0	0		0		0	0								
A 3 T V2 CONDUIT				0	0	0													
A 4 T V2 SERVO ELEC CON				0	0	0													
A 6 T ROD PANEL AMBIENT				0	0														
A 7 T DUMMY ROD INNER A				0															
A 8 T DUMMY ROD INNER B				0															
A 9 T DUMMY ROD OTBRD NUT				0															

E FLIGHT OBJ. COMPOSITE 15 MAY 61 003

				3	4	6	9	12	1[illegible]	16	17	18	21	22	25	26	30	32	35	36	40
A	16	T	DUMMY ROD OUTER A					O													
A	17	T	DUMMY ROD OUTER B					O													
A	19	T	V2 FAIRING AMBIENT 2								O		O	O							
A	20	T	V-2 CLAMSHELL COMPNT								O		O	O							
A	21	T	V-2 FAIRING COMPONET								O		O	O							
A	41	T	MISSILE TK NR PB POD									O	O		O	O					
A	42	T	MISSILE TK NR PB POD									O	O		O	O					
A	43	T	MISSILE TK NR PB POD									O	O		O	O					
A	44	T	MISSILE TK NR PB POD									O	O		O	O					
A	45	T	MISSILE TK NR PB POD									O	O		O	O					
A	46	T	MISSILE TK NR ADF									O	O							O	
A	47	T	MISSILE TK NR ADF									O	O							O	
A	48	T	MISSILE TK NR ADF									O	O							O	
A	49	T	MISSILE TK NR ADF									O	O							O	
A	51	T	MISSILE TK NR AFSWC										O		O	O					
A	52	T	MISSILE TK NR AFSWC										O		O	O					
A	53	T	MISSILE TK NR AFSWC										O		O	O					
A	54	T	MISSILE TK NR AFSWC										O		O	O					
A	55	T	MISSILE TK NR AFSWC										O		O	O					
A	282	T	LO2 FWD BLKHD Q1									O	O	O	O						
A	294	T	LO2 FWD BLKHD Q3									O	O	O	O						
A	409	T	BLACK CALOR QUAD I			O				O	O										
A	412	T	BLACK CALOR QUAD IV			O				O	O										
A	438	T	38 GM CALOR QUAD IV			O				O	O										
A	439	T	38 GM CALOR QUAD I			O				O	O										
A	440	T	19 GM CALOR QUAD IV			O				O	O										
A	443	T	19 GM CALOR QUAD I			O				O	O										
A	446	T	CBLEWAY FRG COMP AMB											O	O	O					
A	452	T	B1 POD AMBIENT										O	O	O						
A	455	T	B2 POD AMBIENT										O	O	O						
A	458	T	AIG POD AMBIENT							O	O	O									
A	467	T	B2 HAT SECTION INBRD							O	O	O									
A	470	T	B2 HAT SECTION OTBRD							O	O	O									
A	473	T	HEAT SHIELD OUTER							O	O	O									
A	47[illegible]	T	HEAT SHIELD INNER							O	O	O									
A	479	T	ADAPTER SECT AMBIENT											O	O	O					
A	488	T	AMB F STG VLV Q3	O	O	O	O	O													

E FLIGHT OBJ. COMPOSITE 15 MAY 61 004

E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40
A 638 T AFT SIDE A FRAME Q2	0	0	0	0	0	0	0	0	0	0	0	0						
A 639 T AMB JET RAIL Q4	0	0	0	0	0													
A 640 T FWD SIDE A FRAME Q4	0	0	0	0	0													
A 641 T AMB F STG VLV Q1	0	0	0	0	0													
A 642 T AMB NEAR B2 GG Q3	0	0		0	0													
A 645 T AMB FWD B1 Q4	0	0	0	0	0													
A 666 T ADAPT SKIN FWD										0	0	0						
A 667 T ADAPT SKIN CTR										0	0	0						
A 668 T ADAPT SKIN AFT										0	0	0						
A 671 T #3 FWD WRG-TBG FRG										0	0	0						
A 674 T FWD WRG-TBG FRG										0	0	0						
A 676 T V2 FRG FWD										0	0	0						
A 677 T V2 FRG CTR										0	0	0						
678 T V2 FRG SIDE										0	0	0						
A 679 T V2 FRG AFT										0	0	0						
A 682 T #1 AIG POD INSUL OUT							0	0	0									
A 683 T #1 AIG POD INSUL IN							0	0	0									
A 684 T #2 AIG POD INSUL OUT							0	0	0									
A 685 T #2 AIG POD INSUL IN							0	0	0									
A 686 T #3 AIG POD INSUL OUT							0	0	0									
A 687 T #3 AIG POD INSUL IN							0	0	0									
A 688 T #4 AIG POD INSUL OUT							0	0	0									
A 689 T #4 AIG POD INSUL IN							0	0	6									
A 690 T #5 AIG POD INSUL OUT							0	0	0									
A 691 T #5 AIG POD INSUL IN							0	0	0									
A 698 T B1 AFT FRG INSUL OUT										0	0	0						
A 699 T B1 AFT FRG INSUL IN										0	0	0						
A 752 T LO2 TANK SKIN STA516										0	0	0						
A 753 T LO2 TANK SKIN STA575										0	0	0						
A 754 T LO2 TANK SKIN STA640										0	0	0						
A 755 T LO2 TANK SKIN STA652										0	0	0						
A 793 T LO2 TANK SKIN STA662										0	0	0						
A 846 T AEDC CALOR B			0	0		0												
A 847 T AEDC CALOR E			0	0		0												
A 848 T AEDC CALOR F			0	0		0												
A 933 T AEDC AFT SHLD CALOR							0	0										
A 934 T AEDC AFT SHLD CALOR							0	0										
A 935 T AEDC AFT SHLD CALOR							0	0										

E FLIGHT OBJ.	COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40	005
A	978 T GE BOOM ANT STRUT										O	O	O							
A	979 T GE BOOM ANT STRUT										O	O	O							
F	771 T LOX TK HE INLET									O	O	O	O							
F	773 T LOX TK ULG STA 540										O	O	O							
F	775 T LOX TK ULG STA 600										O	O	O							
F	777 T LOX TK ULG STA 660										O	O	O							
F	780 T LOX TK ULG STA 720										O	O	O							
F	783 T LOX TK ULG STA 780										O		O							
F	786 T LOX TK ULG STA 840										O		O							
I	534 T ANALOG SIG CONVERTER			O	O	O	O	O												
I	535 T COMPUTER			O	O	O	O	O												
P	671 T TH SECT AMB QUAD 4	O	O	O	O		O	O	O	O	O	O	O							
T	2 T B1 T/C REFER JUNCT	O	O	O	O	O														
T	3 T S T/C REFER JUNCT	O	O	O	O	O														
T	4 T ARMA T/C REF JUNCT							O	O	O										
T	103 T BOOSTER T/C REF			O	O	O	O	O	O											
T	104 T POD 2 T/C REF JUNCT										O	O	O							
T	105 T POD 1 T/C REF JUNCT									O	O	O	O							
T	162 T V T/C REFER JUNCT				O															
AE55	DEMONSTRATE ABILITY OF ROCKET ENGINE HEAT SHIELD AND BOOTS TO PROTECT BOOSTER STRUCTURE INTERIOR FROM HEAT AND EXHAUST GAS ACCUMULATION.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
A	744 I THRUST SECT LITE B2	O	O	O	O	O														
A	409 T BLACK CALOR QUAD I			O				O	O											
A	412 T BLACK CALOR QUAD IV			O				O	O											
A	438 T 38 GM CALOR QUAD IV			O				O	O											
A	439 T 38 GM CALOR QUAD I			O				O	O											
A	440 T 19 GM CALOR QUAD IV			O				O	O											
A	443 T 19 GM CALOR QUAD I			O				O	O											
A	461 T VI HEAT SHIELD										O	O	O							
A	464 T THRST STRUCTURE SKIN							O	O	O										
A	473 T HEAT SHIE[illegible] OUTER							O	O	O										
A	476 T HEAT SHIELD INNER							O	O	O										
A	638 T AFT SIDE A FRAME Q2	O	O	O	O	O	O	O	O	O	O	O	O	O		O	O	O		
A	642 T AMB NEAR B2 [illegible]G Q3	O	O		O	O														

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E FLIGHT OBJ. COMPOSITE 15 MAY 61 006

		3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40
A	645 T AMB FWD B1 Q4	0	0	0	0	0													
A	692 T B1 NACELLE INSUL FWD							0	0	0									
A	693 T B2 NACELLE INSUL FWD							0	0	0									
A	694 T B1 NACELLE INSUL CTR							0	0	0									
A	695 T B2 NACELLE INSUL CTR							0	0	0									
A	696 T B1 NACELLE INSUL AFT							0	0	0									
A	697 T B2 NACELLE INSUL AFT							0	0	0									
P	671 T TH SECT AMB QUAD-4	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0
T	3 T S T/C REF JUNCT			0															
T	4 T ARMA T/C REF JUNCT							0	0	0									
T	103 T BOOSTER T/C REF			0				0	0										
T	104 T POD 2 T/C REF JUNCT										0	0	0						
T	105 T POD 1 T/C REF JUNCT									0	0	0	0						
AE56	DEMONSTRATE ABILITY OF BOOSTER SEPARATION MECHANISM TO JETTISON BOOSTER STRUCTURE WITHOUT INTERFERENCE TO SUSTAINER STAGE SYSTEMS OPERATIONS.	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
I	513 A ACCEL XF1 DIRECT	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
I	514 A ACCEL XF2 DIRECT	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
I	516 A ACCELEROMETER YF1	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
I	517 A ACCELEROMETER ZF1	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
I	519 A ACCELEROMETER YF2	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
I	520 A ACCELEROMETER ZF2	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
I	570 X STAGING SIGNAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M	143 D BSTR SEPERATION	0	0	0	0		0	0											
M	32 X CONAX VALVE COMMAND	0	0	0	0	0			0	0	0	0	0	0	0	0	0	0	0
M	84 X B STG LATCH MSW Q1	0	0	0	0	0													
M	85 X B STG LATCH MSW Q2	0	0	0	0	0													
M	86 X B STG LATCH MSW Q3	0	0	0	0	0													
M	87 X B STG LATCH MSW Q4	0	0	0	0	0													
S	256 D SUSTAINER YAW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	257 D SUSTAINER PITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	52 R ROLL RATE GYRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	53 R PITCH RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	54 R YAW RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U	101 A AXIAL ACCELERATION														0				0

E FLIGHT OBJ. COMPOSITE 15 MAY 61 007

			3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40
AE57		DEMONSTRATE ABILITY OF RETARDING ROCKETS TO SEPARATE MAIN PROPELLANT TANK STRUCTURE FROM RE-ENTRY VEHICLE WITHOUT BUMPING RE-ENTRY VEHICLE.	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
	I	513 A ACCEL XF1 DIRECT	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
	I	514 A ACCEL XF2 DIRECT	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
	I	516 A ACCELEROMETER YF1	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
	I	517 A ACCELEROMETER ZF1	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
	I	519 A ACCELEROMETER YF2	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
	I	520 A ACCELEROMETER ZF2	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
	I	521 X VERN ENG COF SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	P	548 X COMPLETE COF RELAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	S	52 R ROLL RATE GYRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	S	53 R PITCH RATE GYRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	S	54 R YAW RATE GYRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	S	248 X A/P PG SWITCH 17		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	S	248 X RELEASE NOSECONE	0																	
	U	101 A AXIAL ACCELERATION														0				0
	Y	1 X SEPARATION SIG	0	0	0		0	0			0	0	0	0	0	0	0	0	0	0
AE59		OBTAIN DATA ON VIBRATION LEVELS OF MGS COMPONENTS AND ENVIROMENT.	2	2	2					2										
	G	196 O PB-IP RADIAL								0										
	G	587 O POD WAVEGUIDE								0										
	G	595 O PB WAVEGUIDE-RAD								0										
	G	588 P WAVEGUIDE PRESSURE 1	0	0	0															
	G	589 P WAVEGUIDE PRESSURE 2	0	0	0															
	G	281 V RB REFLECT SET	0	0	0															
AE60		OBTAIN DATA ON TANK-SECTION BENDING.		1																
	A	862 O B2 PUMP UNIT Y AXIS		0																
	A	863 O B2 PUMP UNIT Z AXIS		0																
	A	945 O B2 GIMBAL BLOCK Y AX		0																

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E FLIGHT OBJ. COMPOSITE 15 MAY 61 008

	3	4	8	9	12	[illegible]	16	17	18	21	22	25	26	30	32	35	36	[illegible]
A 946 O B2 YAW ACT TIE PT		0																
S 52 R ROLL RATE GYRO SIG		0																
S 53 R PITCH RATE GYRO SIG		0																
S 54 R YAW RATE GYRO SIG		0																
AE61 EVALUATE EFFECT ON MISSILE PERFORMANCE RESULTING FROM REMOVAL OF NONSTRUCTURAL BULKHEAD AND INSULATION PAD.									1		1							2
A 282 T LO2 FWD BLKHD 01									0		0							
A 294 T LO2 FWD BLKHD 03									0		0							
F 1 P LO2 TANK HELIUM									0		0							0
F 3 P FUEL TANK HELIUM									0		0							0
F 34 P FUEL PRESS ORFC DP									0		0							
F 65 P LOX TK HE LN @ ORFC									0		0							
F 147 P LOX PRESS ORFC DP									0		0							0
F 212 P FUEL PRESS ORFC IN									0		0							
F 246 P B TANK HE BOTTLES HI									0		0							0
F 17 T FUEL PRESS ORFC IN									0		0							
F 97 T LO2 TK ULG STA 787									0		0							
F 146 T LOX PRESS ORFC IN									0		0							
F 247 T B TANK HE BOTTLES									0		0							0
F 371 T LO2 TK ULG STA 691									0		0							
F 374 T LO2 TK ULG STA 807									0		0							
F [illegible] T LO2 TK ULG STA 827									0		0							
F 376 T LO2 TK ULG STA 846									0		0							
F 377 T LO2 TK ULG STA 867									0		0							
F 773 T LOX TK ULG STA 540									0		0							
F 774 T LOX TK ULG STA 570									0		0							
F 775 T LOX TK ULG STA 600									0		0							
F 776 T LOX TK ULG STA 630									0		0							
F 777 T LOX TK ULG STA 660									0		0							
F 780 T LOX TK ULG STA 720									0		0							
F 781 T LOX TK ULG STA 740									0		0							
F 782 T LOX TK ULG STA 762									0		0							
F 844 T FUEL TK HE STA 925											0							
F 845 T FUEL TK HE STA 935											0							
F 846 T FUEL TK HE STA 945											0							

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E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40	009
PROPULSION SYSTEM																			
PE51 OBTAIN DATA FOR ANALYSIS OF PROPULSION SYSTEM PERFORMANCE REPEATABILITY.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
I 513 A ACCEL XF1 DIRECT	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
I 514 A ACCEL XF2 DIRECT	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
I 516 A ACCEL YF1	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
I 517 A ACCEL YF2	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
I 519 A ACCEL ZF1	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
. 520 A ACCEL ZF2	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
P 6 P S THRUST CHAMBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 27 P VERNIER FUEL TANK	0	0				0	0	0	0	0	0	0	0		0	0	0		
P 28 P V1 THRUST CHAMBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 29 P V2 THRUST CHAMBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 30 P VERNIER LO2 TANK	0	0			0	0	0	0	0	0	0	0	0		0	0	0		
P 38 P B2 FUEL PUMP DISCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 39 P B1 FUEL PUMP DISCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 59 P B2 THRUST CHAMBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 60 P B1 THRUST CHAMBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 91 P B1 LO2 INJ MANIFOLD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 92 P B2 LO2 INJ MANIFOLD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 185 P B1 TURBOPUMP GEARBOX	0	0		0															
P 188 P B2 TURBOPUMP GEARBOX	0	0		0															
P 279 P B2 LO PR LUB OIL MAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 330 P S FUEL PUMP DISCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 337 P SGG LO2 INJ MAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 341 P S LUBE OIL MANIFOLD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 351 P S LO2 INJ MANIFOLD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 473 P B1 LO PR LUB OIL MAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 671 T TH SECT AMB QUAD 4	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	
P 709 T SGG COMBUSTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 713 T B1 GAS GEN COMBUSTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P 714 T B2 GAS GEN COMBUSTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
X 101 A AXIAL ACCELERATION														0				0	
X 912 PRESSURE VS ALTITUDE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

E FLIGHT OBJ. COMPOSITE 15 MAY 61 010

	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40
PE54 OBTAIN DATA ON BOOSTER AND SUSTAINER ENGINE DIFFERENTIAL THRUST RISE RATES AND BOOSTER, SUSTAINER, AND VERNIER ENGINE THRUST DECAY RATES AND CUTOFF CHARACTERISTICS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
I 513 A ACCEL XF1 DIRECT	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
I 514 A ACCEL XF2 DIRECT	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
I 516 A ACCELEROMETER YF1	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
I 517 A ACCELEROMETER ZF1	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
I 519 A ACCELEROMETER YF2	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
I 520 A ACCELEROMETER ZF2	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
M 79 A MSL AXIAL ACCEL FINE							0	0	0	0	0	0	0		0	0	0	
P 83 B B2 PUMP SPEED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 84 B B1 PUMP SPEED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 349 B S PUMP SPEED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 6 P S THRUST CHAMBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 28 P V1 THRUST CHAMBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 29 P V2 THRUST CHAMBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 38 P B2 FUEL PUMP DISCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 39 P B1 FUEL PUMP DISCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 59 P B2 THRUST CHAMBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 60 P B1 THRUST CHAMBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 91 P B1 LO2 INJ MANIFOLD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 92 P B2 LO2 INJ MANIFOLD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 330 P S FUEL PUMP DISCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 351 P S LO2 INJ MANIFOLD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 709 T SGG COMBUSTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 713 T B1 GAS GEN COMBUSTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 714 T B2 GAS GEN COMBUSTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 1161 X TCC START SWITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 347 X S CUTOFF RELAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 547 X B1 CUTOFF RELAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 548 X COMPLETE COF RELAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 1549 X IGNITION START	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U 101 A AXIAL ACCELERATION														0				0
PE56 DETERMINE SUSTAINER OXIDIZER PUMP NPSH DURING AND IMMEDIATELY FOLLOWING BOOSTER STAGING.	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
P 349 B S PUMP SPEED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40
P 6 P S THRUST CHAMBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 56 P S LO2 PUMP INLET	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 530 T S LO2 PUMP INLET	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PE57 OBTAIN DATA ON PROPULSION SYSTEM STARTING CHARACTERISTICS AS DETERMINED BY THE ROUGH COMBUSTION CUTOFF SYSTEM DURING FRFS.	1																	
P 1439 O S NAA RCC ACCEL	0																	
P 1452 O B1 NAA RCC ACCEL	0																	
P 1453 O B2 NAA RCC ACCEL	0																	
P 1437 W S RCC BINARY COUNTER	0																	
P 1454 W B1 RCC BINARY COUNTR	0																	
P 1455 W B2 RCC BINARY COUNTR	0																	
P 1192 X B1 ROUGH COMB COF	0																	
P 1193 X B2 ROUGH COMB COF	0																	
P 1438 X S ROUGH COMB COF	0																	

PROPELLANT FEED SYSTEM

PE60 OBTAIN DATA FOR ANALYSIS OF PROPELLANT FEED SYSTEM PERFORMANCE REPEATABILITY.	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
P 38 P B2 FUEL PUMP DISCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 39 P B1 FUEL PUMP DISCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 56 P S LO2 PUMP INLET	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 91 P B1 LO2 INJ MANIFOLD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 92 P B2 LO2 INJ MANIFOLD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 330 P S FUEL PUMP DISCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 337 P SGG LO2 INJ MAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 351 P S LO2 INJ MANIFOLD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P 530 T S LO2 PUMP INLET	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U 80 P LO2 TANK HEAD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U 81 P FUEL TANK HEAD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PE61 DETERMINE THAT CLOSURE OF LO2 [illegible] VALVE DOES NOT CAUSE PRESSURE SURGES WHICH EXCEED STRUCTURAL LIMITATIONS OF THE LO2 LINE.	1																	
P 796 A LO2 LINE AXIAL ACCEL	0																	
P 799 A LO2 LINE LAT ACCEL	0				0													
P 56 P S LO2 PUMP INLET	0				0													

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E FLIGHT OBJ. COMPOSITE 15 MAY 61 012

E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40
PROPELLANT UTILIZ SYS																		
UE51 OBTAIN DATA FOR ANALYSIS OF CONVAIR PU SYSTEM PERFORMANCE REPEATABILITY.	1	1	1	1	1	1	1	1	1	1	1							
M 414 P PU VLV CLS-SERVO					O		O		O									
P 528 D S MAIN FUEL VALVE	O	O	O	O	O	O	O	O	O	O	O							
P 529 D S MAIN LO2 VALVE	O	O	O	O	O	O	O	O	O	O	O							
U 107 C PU SV AMP OUT					O			O	O	O	O							
U 1107 C PU SV AMP OUT					O			O	O	O	O							
U 80 P LO2 TANK HEAD	O	O	O	O	O	O	O	O	O	O	O							
U 81 P FUEL TANK HEAD	O	O	O	O	O	O	O	O	O	O	O							
U 91 V ERROR RATIO DEMOD OP	O	O	O	O	O	O	O	O	O	O	O							
U 1091 V ERROR RATIO DEMOD OP	O	O	O	O	O	O	O	O	O	O	O							
U 409 V PU VLV COMMAND VOLT							O											
UE53 OBTAIN DATA FOR ANALYSIS OF ACOUSTICA PU SYSTEM PERFORMANCE REPEATABILITY.												1	1	1	1	1	1	1
U 80 P LO2 TANK HEAD												O	O	O	O	O	O	O
U 81 P FUEL TANK HEAD												O	O	O	O	O	O	O
U 112 V ACOUSTIC COUNTER OTP												O	O		O	O	O	
U 113 V ACOUSTICA VLV POS FB												O	O	O	O	O	O	O
U 132 X AA STA COUNTER OTP												O	O		O	O	O	
U 133 X AA SCHMITT TRIGGER												O	O		O	O	O	
U 134 X AA TIME SHARD OSC OP												O	O		O	O	O	
U 135 X AA SENSORS SIG												O	O	O	O	O	O	O
UE54 OBTAIN DATA ON PU VALVE OPERATION.					1			1	1	1	1							
U 107 C PU SV AMP OUT					O			O	O	O	O							
U 1107 C PU SV AMP OUT					O			O	O	O	O							

E FLIGHT OBJ. COMPOSITE 15 MAY 61 — 013

AUTOPILOT

		3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40
SE51	OBTAIN DATA FOR ANALYSIS OF AUTOPILOT PERFORMANCE REPEAT-ABILITY.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
I	528 V YAW STEERING SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I	529 V ROLL RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I	530 V PITCH RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I	580 V AZM RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I	521 X VERN ENGINE COF SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I	522 X S ENGINE COF SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I	523 X S&V COF RELAYS	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
I	570 X STAGING SIGNAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M	32 X CONAX VALVE COMMAND								0	0	0	0	0	0	0	0	0	0	0
P	347 X S CUTOFF RELAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P	547 X B1 CUTOFF RELAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P	548 X COMPLETE COF RELAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	61 D ROLL DISPL GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	62 D PITCH DISPL GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	63 D YAW DISPL GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	203 D B1 PITCH ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	204 D B2 PITCH ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	205 D B1 YAW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	206 D B2 YAW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	222 D V1 PITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	223 D V2 PITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	233 D V1 YAW ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	234 D V2 YAW ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	256 D SUSTAINER YAW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	25[illegible] D SUSTAINER PITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	52 R ROLL RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	53 R PITCH RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	54 R YAW RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	248 X RELEASE PAYLOAD	0																	
S	248 X [illegible] PG SWITCH 17		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	373 X BOOSTER CUTOFF								0	0	0	0	0	0		0	0	0	
S	374 X SUSTAINER CUTOFF								0	0	0	0	0	0		0	0	0	

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E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40	014
S 376 X VERNIER CUTOFF								0	0	0	0	0	0		0	0	0		
S 379 X FIRE RETROROCKETS								0	0	0	0	0	0		0	0	0		
S 391 X THOR RETROROCKET CMD									0					0		0	0	0	
SE54 DETERMINE ABILITY OF AUTOPILOT TO MAINTAIN STABILITY OF MISSILE/INCLUDE ANTISLOSH BAFFLE EFFECTIVENESS/.	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2				
I 529 V ROLL RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
I 530 V PITCH RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
I 580 V AZM RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 61 D ROLL DISPL GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 62 D PITCH DISPL GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 63 D YAW DISPL GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 203 D B1 PITCH ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 204 D B2 PITCH ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 205 D B1 YAW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 206 D B2 YAW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 222 D V1 PITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 223 D V2 PITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 233 D V1 YAW ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 234 D V2 YAW ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 256 D SUSTAINER YAW	0	0	0		0	0	0	0	0	0	0	0	0	0	0				
S 257 D SUSTAINER PITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 52 R ROLL RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 53 R PITCH RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 54 R YAW RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
SE56 DETERMINE ABILITY OF AUTOPILOT TO EXECUTE PROGRAMMED PITCH MANEUVER.	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2				
I 529 V ROLL RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
I 530 V PITCH RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
I 580 V AZM RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 61 D ROLL DISPL GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 62 D PITCH DISPL GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 63 D YAW DISPL GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 203 D B1 PITCH ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 204 D B2 PITCH ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 205 D B1 YAW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 206 D B2 YAW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

E FLIGHT OBJ. COMPOSITE 15 MAY 61		3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40	015
S	222 D V1 PITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	223 D V2 PITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	233 D V1 YAW ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	234 D V2 YAW ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	256 D SUSTAINER YAW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	257 D SUSTAINER PITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	52 R ROLL RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	53 R PITCH RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	54 R YAW RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
SE58	DETERMINE ABILITY OF AUTOPILOT TO EXECUTE DISCRETE AND STEERING COMMANDS /INCLUDING ROLL MANEUVER/ FROM MISSILE GUIDANCE SET.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
I	528 V YAW STEERING SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
I	529 V ROLL RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
I	530 V PITCH RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
I	580 V AZM RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
I	521 X VERN ENGINE COF SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
I	522 X S ENGINE COF SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
I	523 X S&V COF RELAYS	0	0	0	0	0	0	0	0	0	0	0	0	0		0				
I	570 X STAGING SIGNAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
M	143 D BOOSTER SEPARATION	0	0	0	0		0	0												
M	32 X CONAX VALVE COMMAND								0	0	0	0	0	0	0	0				
P	347 X S CUTOFF RELAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
P	547 X B1 CUTOFF RELAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
P	548 X COMPLETE COF RELAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	61 D ROLL DISPL GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	62 D PITCH DISPL GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	63 D YAW DISPL GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	203 D B1 PITCH ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	204 D B2 PITCH ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	205 D B1 YAW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	206 D B2 YAW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	222 D V1 PITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	223 D V2 PITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S	233 D V1 YAW ROLL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

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E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40	016
S 234 D V2 YAW ROLL	0	0	0	0	0	0	0	.	0	0	0	0	0	0	0				
S 256 D SUSTAINER YAW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 257 D SUSTAINER PITCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 52 R ROLL RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 53 R PITCH RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 54 R YAW RATE GYRO SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 248 X RELEASE PAYLOAD	0																		
S 248 X A/P PG SWITCH 17		0	0	0	0	0	0	0	0	0	0	0	0	0	0				
S 373 X BOOSTER CUTOFF								0	0	0	0	0	0		0				
S 374 X SUSTAINER CUTOFF								0	0	0	0	0	0		0				
S 376 X VERNIER CUTOFF								0	0	0	0	0	0		0				
S 379 X FIRE RETROROCKETS								0	0	0	0	0	0		0				
S 391 X THOR RETROROCKET CMD									0					0					
SE60 DETERMINE PERFORMANCE OF PRODUCTION MODEL OF SPIN MOTOR ROTATION DETECTORS ON RATE AND DISPLACEMENT GYROS AND RATE GYRO GIMBAL TORQUING CAPABILITY.																		1	
S 61 D ROLL DISPL GYRO SIG																		0	
S 62 D PITCH DISPL GYRO SIG																		0	
S 63 D YAW DISPL GYRO SIG																		0	
S 52 R ROLL RATE GYRO SIG																		0	
S 53 R PITCH RATE GYRO SIG																		0	
S 54 R YAW RATE GYRO SIG																		0	
SE61 OBTAIN DATA ON BACK-UP STAGING ACCELEROMETER SYSTEM /FLOWN OPEN-LOOP IN SUPPORT OF ATLAS SPACE VEHICLE BOOSTER PROGRAMS/.						3	3			3									
S 385 V ACCEL 400 CYCLE CONT						0	0			0									
S 359 X BOOSTER STAGING B/U						0	0			0									
SE62 OBTAIN DATA ON MISSILE LATERAL DRIFT UP TO 100 FT AT VERTICAL FLIGHT.			3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
X 0000 X CAMERA COVERAGE			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40	017
GUIDANCE																			
SE63 EVALUATE GROSS PERFORMANCE OF MISSILE GUIDANCE SET.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
I 530 V PITCH RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
I 580 V AZM RESOLVER SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
I 521 X VERN ENGINE COF SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
I 522 X S ENGINE COF SIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
I 523 X S&V COF RELAYS	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
I 525 X PRE-ARM SIGNAL 1	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
I 526 X PRE-ARM SIGNAL 2	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
I 527 X PRE-ARM RELAY CLOS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
I 570 X STAGING SIGNAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PNEUMATIC SYSTEM																			
FE51 OBTAIN DATA FOR ANALYSIS OF PNEUMATIC SYSTEM PERFORMANCE REPEATABILITY.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
F 1 P LO2 TANK HELIUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F 3 P FUEL TANK HELIUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F 34 P FUEL PRESS ORFC DP			0																
F 65 P LO2 TK HE LIN @ ORFC	0	0	0						0	0	0	0							
F 114 P LO2 PRESS REG INLET		0	0		0														
F 145 P S CTL HE BTL DISCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F 147 P LO2 PRESS ORFC DP			0						0	0	0	0							
F 212 P FUEL PRESS ORIFIC IN			0																
F 246 P B TANK HE BOTTLES HI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F 260 P B TANK HE BOTTLES LO	0	[illegible]	0																
F 17 T FUEL PRESS ORIFIC IN			0																
F 115 T LO2 PRESS REG INLET	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F 146 T LO2 PRESS ORFC IN	0	0	0						0	0	0	0							
F 247 T B TANK HE BOTTLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F 290 T S CTL HE BOTTLES	0	0																	

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E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40	018
FE53 DETERMINE EFFICIENCY OF NEW BOOSTER-STAGE HEAT EXCHANGER IN PROVIDING EXPANDED HELIUM FOR MAIN PROPELLANT TANK PRESSURIZATION.	1 1	1 1	1 1	1 1	1 1	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	
F 246 P B TANK HE BOTTLES HI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F 260 P B TK HE BOTTLES LO	0	0	0																
F 115 T LO2 PRESS REG INLET	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F 247 T B TANK HE BOTTLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
FE54 DETERMINE ABILITY OF PNEUMATIC PRESSURE REGULATORS TO MAINTAIN NOMINAL MAIN PROPELLANT TANK PRESSURES.	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	
F 1 P LO2 TANK HELIUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F 3 P FUEL TANK HELIUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F 65 P LO2 TK HE LIN @ ORFC	0	0	0						0	0	0	0							
F 114 P LO2 PRESS REG INLET		0	0		0														
F 212 P FUEL PRESS ORIFIC IN			0																
FE56 EVALUATE TOTAL QUANTITY OF MAIN PROPELLANT TANK PRESSURIZATION HELIUM USED AND QUANTITY USED BY EACH TANK DURING BOOSTER OPERATION.			1																
F 34 P FUEL PRESS ORIFIC DP			0																
F 65 P LO2 TK HE LIN @ ORFC			0																
F 147 P LO2 PRESS ORFC DP			0																
F 212 P FUEL PRESS ORIFIC IN			0																
F 17 T FUEL PRESS ORIFIC IN			0																
F 146 T LO2 PRESS ORFC IN			0																
FE57 DETERMINE TOTAL QUANTITY AND USAGE RATES OF MAIN PROPELLANT TANK PRESSURIZATION HELIUM USED DURING BOOSTER OPERATION.	1	1																	
F 65 P LO2 TK HE LIN @ ORFC	0	0																	
F 246 P B TANK HE BOTTLES HI	0	0																	
F 14 T LO2 PRESS ORFC IN	0	0																	
F 247 T B TANK HE BOTTLES	0	0																	
FE58 DEMONSTRATE ABILITY OF CONTROLS PNEUMATIC SYSTEM TO PROVIDE PRESSURIZATION FOR FLIGHT REQUIREMENTS.	2	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	
F 145 P S CTL HE BTL DISCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F 290 T S CTL HE BOTTLE	0	0																	
P 27 P VERNIER FUEL TANK	0	0				0	0	0	0	0	0	0	0		0	0	0		

E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40	019
P 30 P VERNIER LO2 TANK	0	0			0	0	0	0	0	0	0	0	0		0	0	0		
P 474 P V CTL PRESS REG OUT	0	0	0																
FE59 EVALUATE VIBRATION LEVELS OF FUEL AND LO2 PNEUMATIC REGULATORS.									2	2	2	2	2		2	2	2		
A 781 O BASE LOX TK P REG RD									0	0			0						
A 782 O BASE LOX TK P REG LG									0	0			0						
A 783 O BASE LOX TK P REG TG									0	0			0						
A 784 O LOX TK P REG RADIAL													0						
A 785 O LOX TK P REG TANG													0						
A 786 O BASE F TK P REG RAD											0	0			0	0			
A 787 O BASE F TK P REG LONG											0	0			0	0			
A 788 O BASE F TK P REG TANG											0	0			0	0			
A 789 O FUEL TK P REG RADIAL															0	0			
A 790 O FUEL TK P REG TANG															0	0			
A 925 O LOX TK P REG RADIAL									0	0									
A 926 O LOX TK P REG TANG									0	0									
A 930 O FUEL TK P REG RADIAL											0	0							
A 931 O FUEL TK P REG TANG											0	0							
X 0000 X UNDER CONSIDERATION																	0		
FE61 OBTAIN DATA ON PERFORMANCE OF MISSILE BORNE PORTION OF GROUND POD COOLING SYSTEM.									2										
A 1805 T ROT INVTR B2 Q2				0					0										
A 1807 T ROT INVTR B2 Q2				0					0										
A 1808 T ROT INVTR B2 Q2				0					0										
A 1809 T ROT INVTR B2 Q2				0					0										
A 1810 T ROT INVTR B2 Q2				0					0										
A 1815 T ROT INVTR B2 Q2				0					0										
A 1816 T ROT INVTR B2 Q2				0					0										
A 1817 T ROT INVTR B2 Q2				0					0										
A 1818 T A/P GYRO GROUP YY				0					0										
A 1819 T A/P ELCT PG YY				0					0										
A 1820 T INVTR BAT B2 POD Q2				0					0										
A 1822 T GE PB B1 POD Q4				0					0										
A 1823 T GE PB B1 POD Q4				0					0										
A 1824 T GE PB B1 POD Q4				0					0										
A [illegible] T GE PB B1 POD Q4				0					0										

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E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	[illegible]	35	36	40	020
A 1902 T GE PB B1 POD Q4				0					0										
A 1903 T GE PB B1 POD Q4				0					0										
A 1904 T GE PB B1 POD Q4				0					0										
A 1905 T GE PB B1 POD Q4				0					0										
A 1906 T GE RB B1 POD Q4				0					0										
A 1907 T GE RB B1 POD Q4				0					0										
A 1908 T GE RB B1 POD Q4				0					0										
A 1909 T GE RB B1 POD Q4				0					0										
A 1910 T GE RB B1 POD Q4				0					0										
A 1911 T GE RB B1 POD Q4				0					0										
A 1912 T GE RB B1 POD Q4				0					0										
A 1936 T GE RB B1 POD Q4				0					0										
A 1937 T TLM #2 B1 POD Q1				0					0										
A 1938 T TLM #2 B1 POD Q1				0					0										
A 1939 T TLM #2 B1 POD Q1				0					0										
A 1940 T TLM #2 B1 POD Q1				0					0										
A 1941 T TLM #2 B1 POD Q1				0					0										
A 1942 T TLM #2 B1 POD Q1				0					0										
A 1943 T TLM #2 B1 POD Q1				0					0										
A 1944 T TLM #2 B1 POD Q1				0					0										
L 1452 P PORT MANO				0					0										
L 1453 P PORT MANO				0					0										
L 1454 P VENTRI PITOT TUBE S1				0					0										
L 1455 P VENTRI PITOT TUBE S2				0					0										
L 1456 P VENTRI PITOT TUBE S3				0					0										
L 1457 P VENTRI PITOT TUBE S4				0					0										
L 1458 P VENTRI PITOT TUBE S5				0					0										
L 1462 P VENTRI PITOT TUBE T1				0					0										
L 1463 P VENTRI PITOT TUBE T2				0					0										
L 1464 P VENTRI PITOT TUBE T3				0					0										
L 1465 P VENTRI PITOT TUBE T4				0					0										
L 1466 P VENTRI PITOT TUBE T5				0					0										
L 1450 T PORT THERM 1				0					0										
L 1451 T PORT THERM 2				0					0										
L 1459 T PORT THERM 3				0					0										
L [illegible] T PORT THERM 4				0					0										
L 1461 T PORT THERM 5				0					0										

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E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40	021
H 413 O NAA CONTROL Z AXIS			0																
H 3 P B HYD PUMP DISCH		0																	
H 33 P B1 HYD ACCUMULATOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
H 34 P B2 HYD ACCUMULATOR		0																	
H 52 P S HYD ACCUMULATOR		0	0		0	0													
H 130 P S HYD PUMP DISCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
H 140 P SUS/VERN HYD PRESS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
H 185 P S HYD PUMP INLET		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
H 191 P S HIGH PP TO MAN			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
H 219 P S TK RESVR GAS				0	0	0													
H 224 P B HYD SYS LO PRESS		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
H 225 P B TK RESVR GAS				0	0	0													
H 379 P SUS ROD LINE HI PP			0	0															
H 380 P SUS STAGE LINE HI PP			0	0	0														
H 381 P BOOSTER ROD LN HI PP			0	0															
H 398 P NAA HYD ACCUM GAS			0	0	0	0													
H 408 P HS VALUE OPEN			0																
H 409 P PU VALUE OPEN			0																
H 410 P GG VALUE OPEN			0																
H 383 R SUS FLOW TO RES			0	0	0	0													
H 384 R SUS FLOW TO NAA CONT			0	0	0	0													
H 385 R SUS FLOW FROM V SOLO			0	0	0	0													

HYDRAULIC SYSTEM

HE51 OBTAIN DATA FOR ANALYSIS OF HYDRAULIC SYSTEM PERFORMANCE REPEATABILITY.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
H 33 P B1 HYD ACCUMULATOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H 130 P S HVD PUMP DISCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H 140 P SUS/VERN HYD PRESS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H 185 P S HYD PUMP INLET	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H 191 P S HI PP TO MANIFOLD			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H 212 P VERNIER RETURN			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H 224 P B HYD SYS LO PRESS		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H 1360 P HPU SUSTAINER RETURN			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H 1187 X BSTR OIL EVACUATION			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H 1188 X SUS OIL EVACUATION			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40	022
HE53 DEMONSTRATE ABILITY OF BOOSTER HYDRAULIC POWER SYSTEM AND SUSTAINER HYDRAULIC POWER SYSTEM TO SUPPLY ACTUATOR PRESSURES.	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	
H 382 O SUSTAINER HYD PUMP			o	o															
H 411 O NAA CONTROL X AXIS			o																
H 412 O NAA CONTROL Y AXIS			o																
H 386 R SUS FLOW TO MAN			o	o	o	o													
H 1 T B HYD PUMP DISCH										o	o	o							
H 131 T S HYD PUMP DISCH										o	o	o							
H 184 T SKIN S HYD PUMP			o																
H 316 T ROD PANEL SUS IN			o	o		o													
H 317 T ROD PANEL BOOSTER IN			o	o		o													
H 387 X S ENG CTL BRACKET			o	o	o	o													
H 388 X ENG CNTL TO PR LINE			o	o	o	o													
H 389 X HYD MANIFOLD TO CONE			o	o	o	o													
HE55 DETERMINE ABILITY OF VERNIER SOLO HYDRAULIC SYSTEM TO PROVIDE HYDRAULIC POWER DURING VERNIER STAGE OPERATION.	2	2	1	1	1	1	1	1	2	2	2	2	2						
H 140 P SUS/VERN HYD PRESS	o	o	o	o	o	o	o	o	o	o	o	o	o						
H 212 P VERNIER RETURN			o	o	o	o	o	o	o	o	o	o	o						
ELECTRICAL SYSTEM																			
EE51 OBTAIN DATA FOR ANALYSIS OF ELECTRICAL SYSTEM PERFORMANCE REPEATABILITY.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
E 66 C MISSILE DC AMPS															o	o			
E 50 Q 400 CYCLE AC PWRSUP	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	
E 28 V MSL SYSTEMS INPUT	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	
E 51 V 400 CYCLE AC PHASE A	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	
E 53 V 400 CYCLE AC PHASE C	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	
I 540 V CONTROL 115 PHASE B	o	o	o	o	o	o	o	o	o	o	o	o	o		o	o	o		
PENETRATION SYSTEM																			
HE57 EVALUATE OPEN-LOOP OPERATION OF TANK FRAGMENTATION SYSTEM.																2	2		
D 3 X RSC DESTRUCT OUTPUT																o	o		
F 1 P LOX TANK HELIUM																o	o		
F 3 P FUEL TANK HELIUM																o	o		
I 513 A ACCEL XFI DIRECT																o	o		

E FLIGHT OBJ. COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40	023
I 514 A ACCEL XF2 DIRECT																0	0		
I 516 A ACCELEROMETER YF1																0	0		
I 517 A ACCELEROMETER ZF1																0	0		
I 519 A ACCELEROMETER YF2																0	0		
I 520 A ACCELEROMETER ZF2																0	0		
I 521 X VERN ENGINE COF SIG																0	0		
P 548 X COMPLETE COF RELAY																0	0		
S 52 R ROLL RATE GYRO SIG																0	0		
S 53 R PITCH RATE GYRO SIG																0	0		
S 54 R YAW RATE GYRO SIG																0	0		
S 151 X TANK FRAG DESTRUCT																0	0		
S 248 X A/P PG SWITCH 17																0	0		
S 391 X THOR RETROROCKET CMD																0	0		
ME59 EVALUATE CLOSED-LOOP OPERATION OF TANK FRAGMENTATION SYSTEM. /EFFECTIVITY NOT YET DETERMINED/																			
X C000 X EFFECT NOT YET ESTAB																			
ME60 OBTAIN DATA ON MODIFIED AUTOPILOT COMPONENT OF TANK FRAGMENTATION SYSTEM.									2					2				2	
S 151 X TANK FRAG DESTRUCT									0					0				0	
ME70 DEMONSTRATE COMPATIBILITY OF DECOY POD/S/ WITH ALL MISSILE SYSTEMS.									2	2							2		
A 46 T MISSILE TK NR ADF									0	0							0		
A 47 T MISSILE TK NR ADF									0	0							0		
A 48 T MISSILE TK NR ADF									0	0							0		
A 49 T MISSILE TK NR ADF									0	0							0		
S 52 R ROLL RATE GYRO SIG									0	0							0		
S 53 R PITCH RATE GYRO SIG									0	0							0		
S 54 R YAW RATE GYRO SIG									0	0							0		

NONWEAPON SYSTEM

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E FLIGHT OBJ.	COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40
ME61	DEMONSTRATE COMPATIBILITY OF AFSWC PHASE III POD WITH ALL MISSILES SYSTEMS.										3		3	3		3	3	3	
	A 51 T MISSILE TK NR AFSWC										0		0	0					
	A 52 T MISSILE TK NR AFSWC										0		0	0					
	A 53 T MISSILE TK NR AFSWC										0		0	0					
	A 54 T MISSILE TK NR AFSWC										0		0	0					
	A 55 T MISSILE TK NR AFSWC										0		0	0					
	X 0000 X NO MEAS REQ															0	0	0	
ME62	DEMONSTRATE COMPATIBILITY OF MARK 5 RV WITH ALL MISSILE SYSTEMS.					1					1		1				1	1	
	Y 1 X SEPARATION SIG					0					0		0				0	0	
ME63	DEMONSTRATE COMPATIBILITY OF RVX-2A RV WITH ALL MISSILE SYSTEMS.															1			
	X 0000 X NO SPECIFIC INSTR															0			
ME64	OBTAIN DATA ON PERFORMANCE OF STROBELIGHT OPTICAL BEACON SYSTEM.		2		2	3	3	3	3	3	3	3	3	3		3	3	3	
	M 78 X STROBELIGHT OCCUR		0		0	0	0	0	0	0	0	0	0	0		0	0	0	
	X 0000 X GE-IP GND STA DATA		0		0	0	0	0	0	0	0	0	0	0		0	0	0	
	X 0000 X AZUSA GND STA DATA		0		0	0	0	0	0	0	0	0	0	0		0	0	0	
	X 0000 X BC-4 CAMERA DATA		0		0	0	0	0	0	0	0	0	0	0		0	0	0	
ME66	OBTAIN DATA ON PERFORMANCE OF TELEMETRY SYSTEM /PRIORITY OF INDIVIDUAL CHANNELS ESTABLISHED BY PRIORITY OF DATA/.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	X 0000 X SIGNAL STRENGTH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ME67	OBTAIN DATA PERFORMANCE OF GE MOD III-E SYSTEM.	3	3	3	3	3	3	3	3	3	3	3	3	3		3	3	3	
	G 302 C PB-IP MODULATOR AVG	0	0	0	0	0	0												
	G 504 C MOD III MAGNETRON	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0		
	G 582 E MOD III RB RF OUTPUT	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
ME68	OBTAIN DATA ON PERFORMANCE OF AZUSA SYSTEM.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	X 9145 N RAW AZUSA DATA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Z 3 E XPONDR RF INPUT AGC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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E FLIGHT OBJ. COMPOSITE 15 MAY 61

		3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40
ME69	DETERMINE VIBRATIONAL ENVIRONMENT OF GE MOD III-E SYSTEM				3	3	3		3										
	G 94 O BOC ' ANTENNA				O	O	O												
	G 196 O PB-IP RADIAL								O										
	G 197 O RB-IP RADIAL				O	O	O												
	G 587 O POD WAVEGUIDE				O	O	O		O										
	G 595 O PB WAVEGUIDE RAD								O										
ME71	DEMONSTRATE COMPATIBILITY OF SCIENTIFIC PASSENGER POD/S/ WITH ALL MISSILE SYSTEMS.									2	2		2	2		2	2	2	
	X 0000 X NO SPECIFIC INSTR									O	O		O	O		O	O	O	
	FACILITIES-MISSILE COMPAT																		
LE51	DEMONSTRATE OPERATION OF PEDESTAL TYPE LAUNCHER UNDER SERIES E WEIGHTS, ENGINE THRUSTS, AND ENVIRONMENTAL CONDITIONS.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	X 9176 N PHOTO COVERAGE	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
LE53	DEMONSTRATE ABILITY OF LAUNCH RISE-OFF DISCONNECTS AND UMBILICALS TO PERFORM THEIR FUNCTIONS.	2	2	1		2			2		2								
	L 1398 D MSL VS DISCON Q1 & 2	O																	
	L 1399 D MSL VS DISCON Q3 & 4	O																	
	X 9176 N PHOTO COVERAGE	O	O	O		O			O		O								
	X 0000 X POST TEST INSPECTION	O	O	O		O			O		O								
LE54	ESTABLISH THAT TECHNIQUES AND PROCEDURES FOR TESTING, OPERATING AND EVALUATING MIS-SILE AND SUPPORT EQUIPMENT PRODUCE FLIGHT READINESS.	2	2	2		2			2		2								
	X 0000 X NO SPECIFIC MEAS	X	X	X		X			X		X								
LE55	DETERMINE LOADS ON HOLD-DOWN HOOKS DURING FRF.	1																	
	L 1401 S HD HOOK STRAIN Q1	O																	
	L [illegible]02 S HD HOOK STRAIN Q2	O																	
LE56	DETERMINE TEMPERATURE OF LOWER PEDESTAL FACES DURING FRF.	2																	
	L 14[illegible]5 T L PED INNER FACE Q1	O																	
	L 14[illegible]7 T L PED INNER FACE Q3	O																	
	L 1415 T Q1 PEDESTAL DELTA T	O																	
	L 1416 T Q3 PEDESTAL DELTA T	O																	

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E FLIGHT OBJ. COMPOSITE 15 MAY 61		3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40
LE57	DETERMINE Z-AXIS MOTION OF DISCONNECT PANEL WITH RESPECT TO MISSILE HEAT SHIELD DURING FRF.	2																	
	L 1398 D MSL VS DISCON Q1 & 2	0																	
	L 1399 D MSL VS DISCON Q3 & 4	0																	
NE51	ESTABLISH COMPATIBILITY OF MISSILE, BLOCKHOUSE AND LAUNCH CONTROL EQUIPMENT.	1	2	2		1			2		2								
	X 0000 X NO SPECIFIC MEAS	0	0	0		0			0		0								
NE52	ESTABLISH PROPELLANT TANKING PROCEDURES AND DEMONSTRATE ABILITY OF PROPELLANT TANKING SYSTEM TO PERFORM ITS FUNCTION	1	2	2		1			2		2								
	U 1091 V ERROR RATIO DEMOD OP	0	0	0		0			0		0								
	U 1200 X LO2 100% SLUG COF-1	0	0	0		0			0		0								
	U 1201 X LO2 TOPG HI CTL-1	0	0	0		0			0		0								
	U 1202 X LO2 TOPG LO CTL-1	0	0	0		0			0		0								
	U 1203 X LO2 95% RAPID LOAD-1	0	0	0		0			0		0								
	U 1204 X FUEL 100% SEC CTL	0	0	0		0			0		0								
	U 1205 X FUEL 100% PRI CTL	0	0	0		0			0		0								
	U 1206 X FUEL 95% SEC CTL	0	0	0		0			0		0								
	U 1207 X FUEL 95% PRI CTL	0	0	0		0			0		0								
	U 1208 X LO2 100% SLUG COF-2	0	0	0		0			0		0								
	U 1209 X LO2 TOPG HI CTL-2	0	0	0		0			0		0								
	U 1210 X LO2 TOPG LO CTL-2	0	0	0		0			0		0								
	U 1211 X LO2 95% RAPID LOAD-2	0	0	0		0			0		0								

ASSOCIATE CONTRACTOR SYS

THE FOLLOWING LIST PROVIDES THE BEST INFORMATION AVAILABLE TO CVA ON ASSOCIATE CONTRACTOR TEST OBJECTIVES. THESE OBJECTIVES ARE PROVIDED FOR INFORMATION ONLY & ARE SUBJECT TO CHANGE AT ANY TIME. THE OBJECTIVE NUMBER AT LEFT IS FOR CONVENIENCE & HAS NO RELATION TO ANY APPROVED NUMBER SYSTEM.

E FLIGHT OBJ. COMPOSITE 15 MAY 61		3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40	027
	RE-ENTRY VEHICLE /RV/																			
YE71	EVALUATE THE PERFORMANCE OF ARMING & FUZING SYSTEMS.		1							1										
YE72	EVALUATE PERFORMANCE OF THE RV /HEATING, LOADING, ABLATION, STABILITY, & SEPARATION/.		1			1	1													
YE73	DEMONSTRATE COMPATIBILITY OF THE RV WITH THE E SERIES MISSILE, IN PARTICULAR, THE FLIGHT CONTROL SYSTEM.	2																		
YE74	DETERMINE PERFORMANCE OF RV /HEATING, LOADING, ABLATION, STABILITY, ARMING & FUZING, & SEPARATION./	2				1			1											
YE75	DEMONSTRATE THE PERFORMANCE OF ARMING & FUZING SYSTEM.				1		1		2											
YE76	DETERMINE THE PERFORMANCE OF THE RV ARMING AND FUZING SYS-TEMS.			1		1		1												
YE77	DETERMINE THE COMPATIBILITY OF THE RV WITH ALL MISSILE SUB-SYSTEMS.			1						1										
YE78	OBTAIN DATA ON PENETRATION CHARACTERISTICS DURING RE-ENTRY PHASE.			3	3		3	2	3	1										
YE79	DEMONSTRATE R/V SUBSYSTEM PERFORMANCE							2												
YE80	EVALUATE THE MARK 5 ABLATION MATERIAL PERFORMANCE DURING RE-ENTRY.										1									
YE81	DETERMINE THE MARK 5 AERODYNAMIC HEATING, LOADING AND STABILITY DURING RE-ENTRY										1									
YE82	DETERMINE THE MARK 5. SEPARATION AND ARMING AND FUZING SUBSYSTEMS PERFORMANCE.										1									
	WARHEAD /WH/																			
KE71	DETERMINE WH PERFORMANCE /SANDIA/.				1			1												
KE72	EVALUATE WH FLIGHT ENVIRONMENT AND ITS ABILITY TO MEET LONG RANGE OPERATION REQUIREMENTS /SANDIA/.				1															

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E FLIGHT OBJ.	COMPOSITE 15 MAY 61	3	4	8	9	12	13	16	17	18	21	22	25	26	30	32	35	36	40	028
	GUIDANCE																			
IE71	EVALUATE INERTIAL GUIDANCE SYSTEM PERFORMANCE & ACCURACY /ARMA/.	2	1		1	1	1	1	1	1	1									
IE72	EVALUATE INERTIAL GUIDANCE SYSTEM COMPATIBILITY WITH ALL ASSOCIATED MISSILE SUBSYSTEMS /ARMA/.	1	1		1															
IE73	DETERMINE PERFORMANCE OF AIG ALIGNMENT-COUNTDOWN SET AND ASSOCIATED GSE /ARMA/.				2	2														
IE74	EVALUATE PERFORMANCE & ACCURACY OF THE GUIDANCE SYSTEM INCLUDING MGS & GSE /ARMA/.			1																
IE75	EVALUATE PERFORMANCE & ACCURACY OF THE MGS INCLUDING COMPUTER, PLATFORM, CONTROL UNIT, AND ANALOG & DIGITAL CONVERTERS /ARMA/.			1																
IE76	DEMONSTRATE MGS COMPATIBILITY WITH ALL ASSOCIATED MISSLE SUBSYSTEMS /ARMA/.			1																
IE77	DETERMINE OPE[illegible]AL SUITABILITY O[illegible] III ALIGNMENT-COUN[illegible]N SET /ARMA/.								2		2									

This material contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C., Sections 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

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CONVAIR-ASTRONAUTICS

SECTION 10

RANGE DATA

This section presents a grouping of the data which is gathered externally, to the missile, by the range. Note that this section is presented by Areas of Interest. The following is a brief explanation of the format used in this section.

AREA OF INTEREST

This is a heading, which identifies the area into which the DATA following are grouped.

MEASUREMENT INTERVAL

This provides an indication of the area, either in time or in function units, over which the DATA is to be recorded.

REMARKS

This summarizes the method of data presentation as well as other significant details.

RANGE SAFETY

X 9121 Q	RSC TRANSMITTER	T-1 MIN TO SIG LOSS	KC	20		GRAPH W/RESOLUTION OF 40 KC AROUND MEAN FREQUENCY
X 9124 Q	RSC CARRIER	T-1 MIN TO SIG LOSS	KC	05%	5	DIRECT WRITING RECORDER - GRAPH W/RESOLUTION OF .01% ABOUT MEAN CARRIER FREQUENCY

DATA DESCRIPTION

This is a brief, usually abbreviated description of the DATA.

UNITS OF FUNCTION

SAMPLING RATE

This is a statement of the required minimum data sampling rate expressed in data points per second.

DATA IDENTIFICATION

Two letters are included. The first denotes the system instrumented while the latter indicates the type of measurement. The four numerical digits provide an identification of the measurement within the system indicated by the first letter.

ACCURACY

This expresses the desired accuracy in either plus or minus units of function, or in percent of actual value measured.

15 MAR 60 E SERIES AMR RANGE DATA PAGE 001

SYSTEM	MEAS NO	TYPE	DESCRIPTION OF DATA	TRAJECTORY INTERVAL COVERED	SR AA MT PE L/ IS NE GC	DATA ACCURACY	PRESENTATION AND OTHER REMARKS
			FLIGHT TRAJECTORY POSITION				
X	9128	H	VEHICLE XYZ VS TIME			CLASS I	TAB/IBM CARDS OR MAGNETIC TAPE, AND PLOTTING BOARD CHARTS.
				0-5000FT	2	0.5FT OR 0.5 %	
				5000 FT-BECO	2	25 FT	
				BECO-VECO PLUS 10 SEC	2	500 FT	
						CLASS II	
				0-5000FT	2	.25FT OR .25 %	
				5000 FT-BECO	2	10 FT	
				BECO-VECO PLUS 10 SEC	2	100 FT	
				VECO-RV SEP PLUS 31 SEC	2	50 FT	
				RE-ENTRY TO IMPACT	2	100 FT	
X	9145	N	AZUSA DATA	TO LIMIT OF AZUSA	10		IBM 729 TAPE WITH REAL TIME FLIGHT DATA. PHASE DATA TAPE PLAYBACK OF AZUSA. COPY OF LOG FROM AZUSA SITE-LIST PHENOMENA OBSERVATION INCLUDING L, M, AND R CHANNEL STATES. OSC ROLLS PLUS CALIBRATION SHEETS. AMPEX FR114 TAPES.
X	9150	H	RANGE SAFETY IP	LAUNCH TO IMPACT	C		COPY OF EACH STANDARD RANGE SAFETY GRAPH.
X	9192	H	MILS IMPACT POINT	SPLASH NET	2	CLASS I 0.5 NM	TAB EXPRESSED IN GEODETIC AND GEOCENTRIC LATITUDE &

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'5 MAR 60 E SERIES AMR RANGE DATA PAGE 002

		IMPACT		CLASS II 0.1 NM	LONGITUDE FOR SPLASH NET IMPACTS.
X 9151 H	SOFAR IMPACT POINT	AT NOSECONE IMPACT	2	CLASS I 0.5 NM CLASS II 0.1 NM	TAB EXPRESSED IN GEODETIC AND GEOCENTRIC LATITUDE & LONGITUDE FOR SPLASH NET IMPACTS.
X 9152 H	AZUSA IMPACT POINT	AT IMPACT	2	0.5 NM	TAB.
X 9154 H	RADAR IMPACT POINT	AT IMPACT	2	0.5 NM	TAB.
X 9155 H	TERMINAL TRAJECTORY	PAYLOAD SEP TO IMPACT	2	0.5 NM	GRAPH OR TAB.
X 9177 H	MOD III INST SYS IP	AT IMPACT	2	0.5 NM	TAB.
	VELOCITY				
X 9156 L	VEH XYZ & RESULTANT			CLASS I	TAB. IBM CARDS OR MAGNETIC TAPE. DERIVE FROM POSITION DATA.
		0-5000FT	2	2 F/S	
		5000 FT-BECO	2	3 F/S	
		BECO-VECO PLUS 10 SEC	2	15 F/S	
				CLASS II	
		0-5000FT	2	1 F/S	
		5000 FT-BECO	2	1 F/S	
		BECO-VECO PLUS 10 SEC	2	10 F/S	
		VECO-RV SEP PLUS 10 SEC	2	10 F/S	
		RE-ENTRY TO IMPACT	2	100 F/S	
				CLASSIII	
		BECO-VECO PLUS 10 SEC	2	0.1 F/S	
	ACCELERATION				
X 9158 A	VEHICLE XYZ			CLASS I	TAB. IBM CARDS OR 729 TAPE INCLUDE METHOD USED.
		0-5000FT	2	0.1 G	
		5000 FT-BECO	2	0.3 G	
		BECO-VECO PLUS 10 SEC	2	0.3 G	
				CLASS II	
		0-5000FT	2	0.05 G	
		5000 FT-BECO	2	0.1 G	

		BECO-VECO PLUS 10 SEC	2	0.2 G	
		VECO-RV SEP PLUS 10 SEC	2	0.2 G	
	TELEMETRY				
X 9204 Q	SS #1 VIDEO COMP	T-4M TO T 5M T-4M & ON		CLASS I CLASSIII	SEE TAPE FORMAT SECTION 5-1.
X 9205 Q	SS #2 VIDEO COMP	T-4M TO T 5M T-4M & ON		CLASS I CLASSIII	SEE TAPE FORMAT SECTION 5-1.
X 9206 Q	SS #3 VIDEO COMP	T-4M TO T 5M T-4M & ON		CLASS I CLASSIII	SEE TAPE FORMAT SECTION 5-1.
	TRACKING				
X 9137 N	AZUSA CEC RECORDINGS	SYSTEM OPER-ATION		*	INCLUDE ANALOG CALIBRATION FOR OSCILLOGRAPHS, AND DIGITAL CALIBRATION TO 709
X 9140 E	RADAR RECEIVER SIG	TO LIMIT OF RADARS		1 DB	CORRELATE GRAPHS FOR EACH RADAR WITH COMMON TIME SCALE AND RESOLUTIONS OF 0.5 DB. INDICATE LOCATIONS OF STATIONS IF USED FOR SKIN TRACKING.
X 9165 N	RADAR SYSTEM LOG	SYSTEM OPER-ATION			LOG.
X 9166 N	ICM SIGNALS	TO LIMIT OF ICM COVERAGE		2 DB AT 10 KC	LOG AND/OR RCA REPORT. SPECTRUM TYPE GRAPHS WITH RESOLUTION OF 40 KC.
	WEATHER				
X 9129 P	PRESSURE VS ALTITUDE	SURFACE 0-60K FT 60K-200K FT	C C C	2 MB 2 % 5 %	GRAPH OR TAB. RAWINGSONDE RECORDING TO BE MADE AT LAUNCH. SOUNDING TO BE CHOSEN BY WEATHER STAFF AS INDICATIVE OF LAUNCH COND-ITIONS. OBSERVATIONS TO BE MADE AT LAUNCH, T-60, T-120, T-180, T-240, T-300

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						AND T-340.
X 9141 T	TEMP VS ALTITUDE	SURFACE		C	2 DGC	GRAPH OR TAB. RAWINGSONDE RECORDING TO BE MADE AT LAUNCH. SOUNDING TO BE CHOSEN BY WEATHER STAFF AS INDICATIVE OF LAUNCH COND-ITIONS. OBSERVATIONS TO BE MADE AT LAUNCH, T-60, T-120, T-180, T-240, T-300 AND T-360.
		0-200K	FT	C	2 DGC	
X 9146 L	WIND SPEED	SURFACE		C	10 F/S	GRAPH OR TAB. RAWINGSONDE RECORDING TO BE MADE AT LAUNCH. SOUNDING TO BE CHOSEN BY WEATHER STAFF AS INDICATIVE OF LAUNCH COND-ITIONS. OBSERVATIONS TO BE MADE AT LAUNCH, T-60, T-120, T-180, T-240, T-300 AND T-360.
		0-25K	FT	C	10 F/S	
		25K-45K	FT	C	10 F/S	
		45K-200K	FT	C	10 F/S	
X 9147 Z	WIND AZIMUTH	SURFACE		C	10 DEG	GRAPH OR TAB. RAWINGSONDE RECORDING TO BE MADE AT LAUNCH. SOUNDING TO BE CHOSEN BY WEATHER STAFF AS INDICATIVE OF LAUNCH COND-ITIONS. OBSERVATIONS TO BE MADE AT LAUNCH, T-60, T-120, T-180, T-240, T-300 AND T-360.
		0-25K	FT	C	5 DEG	
		25K-45K	FT	C	5 DEG	
		45K-200K	FT	C	5 DEG	
X 9148 N	RELATIVE HUMIDITY	AT LAUNCH POINT.		C	5 %	OBSERVATION TO BE MADE AT LAUNCHS T-60, T-120, T-180 T-240, T-300, AND T-360.
X 9170 N	VISIBILITY	AT LAUNCH POINT.			NM	ACCURACY -0.5NM LESS THAN 10NM, 1NM GREATER THAN 10NM. OBSERVATION TO BE MADE AT LAUNCHS T-60, T-120, T-180 T-240, T-300, AND T-360.
X 9207 N	PRECIPITATION	AT LAUNCH POINT.			0.05 IN	OBSERVATION TO BE MADE AT LAUNCHS T-60, T-120, T-180 T-240, T-300, AND T-360.

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X 9168 N	CLOUD COVERAGE	AT LAUNCH POINT.	0.1 %	OBSERVATION TO BE MADE AT LAUNCHS T-60, T-120, T-180 T-240, T-300, AND T-360.
	DOCUMENTARY			
X 9176 N	PHOTO COVERAGE	AT LAUNCH.		AS ESTABLISHED BY CV-A MOTION PICTURE SECTION.
	GEOPHYSICAL			
X 9196 N	LAUNCH GEO LOCATION	LAUNCH POINT		ACCURACY-FIRST ORDER SURVEY DATA TO BE PROVIDED WITH REFERENCE TO CLARKES SPHEROID OF 1866. X AXIS-POS. ALONG PCHOVER AZIMUTH,YAXIS-POSITIVE 90 DEGREES COUNTER CLOCKWISE FROM POSITIVE X AXIS, Z AXIS-POSITIVE UPWARD. ORIGIN-INTERSECTION OF LONGITUDINAL AXIS OF ERECTED VEHICLE AND LAUNCH STAND LOCK PINS AXIS.

SYMBOL EXPLANATION

* BEST DATA AVAILABLE

DATA TAKEN FROM CV-A PRELIMINARY PROGRAM REQUIREMENTS DOCUMENT.

APPENDIX A

INSTRUMENTATION
CODE KEY

APPENDIX

E SERIES
IBM CODE KEY

APPENDIX A

INSTRUMENTATION CONFIGURATION

IBM CODE KEY

Master tabulations of all performance measurements applicable to all test articles are maintained by the Test Planning Group. Operational tabulations are compiled from these masters for individual missiles. All instrumentation logs are maintained on IBM punched cards. This facilitates rapid sorting, rearrangement, and tabulation of measurements as required for program preparation and data analysis. Such storage necessitates a systematic classification of the measurements and uniformity in method used to describe the many types of measurements. To achieve this, an extensive coding of the identification, description, and measurement parameters is necessary. The following is an explanation and key for this coding. Each section may be identified in the key by the section heading or the IBM card column number.

I. VEHICLE IDENTIFICATION (Col. 3)

This column identifies the vehicle on which the parameter being measured is located.

II. MEASUREMENT IDENTIFICATION (Col. 4-9)

A. Each measurement has a unique six-character identification. The first character defines the system within which the measurement exists. The second character defines the monitoring agency. The third, fourth, and fifth characters are number assignments which define a particular measurement within the system defined by the first character. The sixth character defines the type of measurement.

```
A   P   1   001   P
|   |   |    |    └── Type of Measurement (Col. 9)
|   |   |    └─────── Number Assignment (Col. 6-8)
|   |   └──────────── Monitoring Agency (Col. 5)
|   └──────────────── System (Col. 4)
└──────────────────── Vehicle (Col. 3)
```

SYMBOL	VEHICLE (Col. 3)	SYSTEM (Col. 4)**	TYPE OF MEASUREMENT (Col. 9)
A	Atlas Booster	Airframe	Acceleration
B	*	*	Rotation Rate
C	Centaur	*	Current
D	*	Range Safety Command	Deflection
E	*	Electrical	Power
F	*	Pneumatic	Force
G	*	*	*
H	*	Hydraulic	Position
I	*	Guidance (Inertial)	Intensity
J	*	*	*
L	AGENA 2nd Stage	Launcher	Velocity
M	Mercury Capsule	Miscellaneous	Mass
N	*	Facilities and Site	Camera Coverage
O	*	*	Vibration
P	*	Propulsion	Pressure
Q	*	*	Frequency
R	*	*	Rate
S	ABLE	Flight Control (SERVO)	Strain
T	*	Telemetering	Temperature
U	*	Propellant Utilization & Loading	*
V	*	*	Voltage
W	*	Weapon System	Time
X	*	External	Discrete Position
Y	*	Payload	Acoustical
Z	*	Azusa Transponder	Azimuth

* Note: Unassigned
** For measurements made via Atlas telemetering system only.

MONITORING AGENCY (Col. 5)

0	Telemetering
1	Direct Line (Captive Test and AMR Landline)
3	Checkout and Validation Instrumentation
9	Range Data
M	Visual Panel Presentations

III. MEASUREMENT RANGE (Col. 35-42)

This represents the desired capability of the measuring system. "M" preceding a number indicates minus quantity.

IV. UNITS OF FUNCTION (Col. 43-45)

AMP	Amperes	KPS	Kilo-pounds
CPS	Cycles per second	KPM	Thousands of RPM's
DB	Decibles	LBS	Pounds
DBM	Decibles above 1 Milliwatts	MA	Milliamperes
DEG	Degrees Angular	MC	Megacycles
DGC	Degrees Centigrade	ME	Milliwatts
DGF	Degrees Fahrenheit	MII	Microinches per inch
DGR	Degrees Rankine	MS	Milliseconds
D/S	Degrees per second	MV	Millivolts
E	Watts	PIA	Pounds per square inch absolute
F/S	Feet per second	PID	Pounds per square inch differential
FS^2	Feet per second^2		
FTC	Foot candles	PIG	Pounds per square inch gage (D)
FTN	Foot ton	PPS	Pulses per second
G	Acceleration of Gravity	PS	Pounds per second
GPM	Gallons per minute	PSI	Pounds per square inch
GPS	Gallons per second	RPM	Revolutions per minute
HR(S)	Hours	RS^2	Radians per second^2 (D)
IN	Inches	SPS	Samples per second
INW	Inches of water	UV	Microvolts
ILB	Inch pounds	UA	Microamperes
IPI	Inches per inch	VAC	Volts, alternating current
KC	Kilocycles	VDC	Volts, direct current
KID	Thousands of pound per square in. differential	VPK	Peak volts, AC
		PRV	Phase reversing AC voltage

V. FREQUENCY RESPONSE REQUIRED (Col. 49-51)

The required response of the measuring system in cycles per second unless otherwise noted or implied.

SLO	Less than 1 cycle per second
400	400 cycles per second
1KC	1 Kilocycle (1000 cycles) per second
2MC	2 Megacycles (2,000,000 cycles) per second
STP	Step Function
UNK	Unknown

VI. TYPE OF TRANSDUCER (Col. 52-61)

*Indicates an "off the shelf" commercial transducer. This is followed by a coded identification of the vendor and the vendor model number if known.

<u>Vendor Code</u>

WK	Wianco Engineering Co.	BLH	Baldwin-Lima Hamilton
MASSA	Massa Laboratories, Inc.	T	Thermo Electric Co., Inc.
R-D	Rocketdyne	WAUGH	Waugh Engineering Co.

▭ Indicates the transducer is the same one as that used for the measurement number immediately following this symbol.

VII. <u>TRANSDUCER SERIAL NUMBER</u> (Col. 62-66)

VIII. <u>TRANSDUCER LOCATION</u> (Col 67-70)

<u>Station Number</u> (Col. 67-70)

Location by station number to the nearest inch.

<u>Quadrant Number</u> (Col. 71)

1	Quadrant I
2	Quadrant II
3	Quadrant III
4	Quadrant IV
X	XX Axis
Y	YY Axis

FOR LANDLINE AND CAPTIVE TEST

IX. TYPE OF RECORDER (Col. 30-34)

A	AM tape
D	Sanborn type recorder
E	Eput meter, counter
F	FM tape
G	Esterline-Angus-Type AW Graphic Recorder
L	Panel Light
M	Meter
O	Oscillograph (CEC)
P	Printer
R	EA Sequence Recorder
S	Strip chart (Brown, Speedomax)

FOR TELEMETERING ONLY

X. MEASUREMENT CHANNEL ASSIGNMENTS (Col. 30-34, on TLM only)

Telemeter transmitter number (Col. 30)

Subcarrier channel numbers (Col. 31-32)

1-13, A, C, E

Pin number (Col. 33-34)

Pin number if commutated in telemeter package

Pin number 1 thru 60

TYPE OF MEASUREMENT (Col. 76, on TLM only)

P Primary - An original measurement with one transducer, the output of which is sent to only one telemetering package.

M Multiple - When a measurement is picked up by one transducer but sent over two or more telemetering packages the original measurement is considered primary and the repeated ones considered multiple.

SPECIAL CODING (Col. 76, on TLM only)

C Installation Drawing/Wiring Diagram

XI. OBJECTIVE/INSTRUMENTATION COMPOSITE

A. Objective Coding

1. The coding system for test objectives has been developed to provide a rapid means of identification and handling of a large number of objectives. Coded objectives are listed along with the instrumentation required for accomplishment.

X — System (Alphabetical)
X — Missile Series (Alphabetical)
XX — Objective (Numerical 1-99)

2. Letters used to identify the system are identical to those used to identify the system described in Section II of the code key.

B. Standard Objective Terminology

Each objective will contain one of the following five key terms. These terms defined below will establish a standard datum for uniform interpretation of test objectives.

1. DEMONSTRATE (DEM) denotes the occurrence of an action or an event during a test. The accomplishment of this type objective requires a qualitative answer. The answer will be derived through the relation of this action or event to some other known information or occurrence. This category of objective implies a minimum of airborne instrumentation, and/or that the information be obtained external to the missile.

2. DETERMINE (DET) denotes the measuring of performance of any unit or system. This category implies the quantitative investigation of overall operation which includes, generally, instrumentation for measuring basic inputs and outputs of the unit or system. The information obtained should indicate to what extent the system is operating as designed. The instrumentation

should allow performance deficiencies to be isolated to either the system or to the system inputs.

3. EVALUATE (EVAL) denotes the measuring of performance of any unit or system as well as the performance and/or inter-action of its sections or subsystems that are under investigation.

The accomplishment of objectives of this type requires quantitative data on the performance of both unit or system and its sections or subsystems. Instrumentation for this category generally includes measuring basic inputs and outputs of the unit or system as well as basic inputs and outputs of its sections or subsystems. The performance levels of the sections or subsystems will then be analyzed for their contribution toward performance of the unit or system. This category will provide the most detailed information of any of these categories.

4. OBTAIN DATA (OBTN) denotes gathering engineering information which is to be measured to augment the general knowledge required in the development of the over-all weapon system. This category may also be used for supplemental investigations such as environmental studies, ascertaining k factors, ground equipment studies, etc. The degree of instrumentation is not implied by this definition; individual objectives will indicate extent of instrumentation required.

5. ESTABLISH (ESTB) denotes gathering engineering information for the development of ground procedures and operating techniques. Objectives in this category are not necessarily dependent on analytic studies.

A

A/B	AIRBORNE
A/P	AUTOPILOT
AC	ALTERNATING CURRENT
ACA, AA	ACOUSTICA
ACCEL	ACCELERATION
ACCRY	ACCESSORY
ACLMTR	ACCELEROMETER
ACTR	ACTUATOR
ACUM	ACCUMULATOR
ADAPT	ADAPTER
ADF	AERONUTRONICS DIV. OF FORD
AEDC	ARNOLD ENGINEERING DEVELOPMENT CENTER
AFCRC	AIR FORCE CAMBRIDGE RESEARCH CENTER
AFSWC	AIR FORCE SPECIAL WEAPON CENTER
AGC	AUTOMATIC GAIN CONTROL
IG	ALL INERTIAL GUIDANCE
LTR	ALTERNATE
MB	AMBIENT
MPL	AMPLIFIER
NG	ANGLE
NT	ANTENNA
PS	ACCESSORY POWER SUPPLY
SC	ANALOG SIGNAL CONVERTER
SSY	ASSEMBLY
TT	ATTITUDE
UD	AUDIO
UX	AUXILIARY
VG	AVERAGE
X	AXIS
Z	AZIMUTH

B

	BOOSTER
/U	BACKUP
1	BOOSTER #1
2	BOOSTER #2

B

B-O	BOIL OFF
B & S	BOOSTER & SUSTAINER
BAT	BATTERY
BCN	BEACON
BGG	BOOSTER GAS GENERATOR
BHD	BULKHEAD
BK	BREAK
BKHS	BLOCKHOUSE
BLWS	BELLOWS
BRG	BEARING
BRKT	BRACKET
BSTR	BOOSTER
BTL	BOTTLE
BYP	BYPASS

C

C	HUNDREDS
C-O, COF	CUT OFF
CALIB	CALIBRATE
CALOR	CALORIMETER
CH	CHILL
CHAN	CHANNEL
CHM	CHAMBER
CKT	CIRCUIT
CLSD	CLOSED
CLSG	CLOSING
CMD	COMMAND
CMPST	COMPOSITE
COMB	COMBUSTION
COMPT	COMPARTMENT
CONV	CONVERTER
CTL	CONTROL
CTR	CENTER
CY	CYCLE
CYL	CYLINDER

D

DC	DIRECT CURRENT
DCDR	DECODER
DEFLN	DEFLECTION
DEFLR	DEFLECTOR
DEMOD	DEMODULATOR
DESTR	DESTRUCTOR
DG	DISPLACEMENT GYRO
DI	DISCRETE INTEGRATOR
DIS	DISCRETE
DISCH	DISCHARGE
DISCON	DISCONNECT
DISPL	DISPLACEMENT
DN	DOWN
DO	DROP OUT
DP	DIFFERENTIAL PRESSURE

E

EMER	EMERGENCY
ENG	ENGINE
ETP	ENGINE TEST PANEL
EXHST	EXHAUST
EXT	EXTERNAL

F

F, FUL	FUEL
FAIL	FAILURE
FB	FEEDBACK
FIL	FILAMENT
FIN	FINE
FREQ	FREQUENCY
FRG	FAIRING
FV	FUEL VALVE
FWD	FORWARD

G

GEN	GENERATOR
GG	GAS GENERATOR
GM	GRAM D
GPM	GALLONS PER MINUTE
GND	GROUND
GN_2	GASEOUS NITROGEN
GO_2	GASEOUS OXYGEN

H

H/D	HOLDDOWN
HE	HELIUM
HI	HIGH
HORZ	HORIZONTAL
HPD	HYDRAULIC PUMP DISCHARGE
HPU	HYDRAULIC PUMPING UNIT
HS	HYDRAULIC SUPPLY D
HSP	HELIUM STORAGE PANEL
HT	HEAT
HTR	HEATER
HYD	HYDRAULIC

I

IF	INTERMEDIATE FREQUENCY
IGN	IGNITOR OR IGNITION
INFO	INFORMATION
INJ	INJECTOR OR INJECTION D
INL	INLET
INST	INSTRUMENTATION
INSUL	INSULATION D
INT	INTERNAL
INVTR	INVERTER

D

J

JET	JETTISON
JUNCT	JUNCTION

K D

K	THOUSANDS

	L	
D	L, LCHR	LAUNCHER
	LKN	LOCKIN
	LN	LINE
	LNG	LONG
	LN_2	LIQUID NITROGEN
D	LONG	LONGITUDINAL
	LO_2	LIQUID OXYGEN
	LT	LIGHT
D	LUB	LUBE
	LVL	LEVEL
	M	
D	MAG	MAGNETRON
	MAN	MANUAL
	MAN	MANIFOLD
	MANO	MANOMETER
	MC	MEGACYCLES
	MSL	MISSILE
	MSW	MICROSWITCH
	MULT	MULTIPLIER
	N	
	NAA	NORTH AMERICAN AVIATION
D	NO.	NUMBER
D		
	O	
D	OP	OPTICAL PROBE, OUTPUT, OPERATIONAL
	OPN	OPEN
D	OPER	OPERATIONAL
	ORFC	ORIFICE
	OSC	OSCILLATOR
D	OTP	OUTPUT
	OUTBR	OUTBOARD

P	
P	PRESSURE
PB	PULSE BEACON
PB-IP	PULSE BEACON-IMPACT PREDICTOR
PC	PITCH
PCH	PITCH
PCT	PERCENT
PCU	PRESSURIZATION CONTROL UNIT
PG, PRGR	PROGRAMMER
PH	PHASE
PNEU	PNEUMATIC
POS	POSITION OR POSITIONER
PPS	PULSES PER SECOND
PRESD	PRESSURIZED
PRESS	PRESSURIZATION
PRG	PURGE
PROP	PROPELLANT
PROP VLVS	PROPELLANT VALVES
PS	POUNDS PER SECOND
PS	POWER SUPPLY
PU	PROPELLANT UTILIZATION
PUV	PROPELLANT UTILIZATION VALVE
PWR	POWER
PWRSUP	POWER SUPPLY
Q	
Q	GE YAW RATE
QUAD	QUADRANT
R	
R	ROLL
RAD, RD	RADIAL
RB	RATE BEACON
RB-IP	RATE BEACON-IMPACT PREDICTOR
RCC	ROUGH COMBUSTION CUT-OFF

R

REDNT	REDUNDANT
REF	REFERENCE
REG	REGULATOR
REGS	REGULATORS
REL	RELAY
RESVR	RESERVOIR
RF	RADIO FREQUENCY
RG	RATE GYRO
RNG	RANGE
RSC	RANGE SAFETY COMMAND
RV	RE-ENTRY VEHICLE (NOSECONE)

S

S	SUSTAINER
SA	SERVO AMPLIFIER
SECT	SECTION
SEP	SEPARATION
SEQ	SEQUENCE
SGG	SUSTAINER GAS GENERATOR
SHLD	SHIELD
SIG	SIGNAL
SNERS	SENSORS
SNSR	SENSOR
SOL	SOLENOID
SRV VLV	SERVOVALVE
STA	STATION
STP	STOP
STRUC	STRUCTURE
SUP	SUPPLY
SUS	SUSTAINER
SW	SWITCH
SYS	SYSTEM

T

T/C	THERMOCOUPLE	
TAB	TABULATION	D
TACH	TACHOMETER	
TANG	TANGENTIAL	
TCC	TEST CONDUCTOR'S CONSOLE	D
TEMP	TEMPERATURE	
THR	THRUST	
TK	TANK	
TLM	TELEMETER	
TMR	TIMER	
TOPG, TPNG	TOPPING	D
TOT	TOTAL	
TRG	TRAJECTORY	

U D

U	UPPER	D
UMBL	UMBILICAL	
UP	UPPER	

V

V1	VERNIER ENGINE #1	
V2	VERNIER ENGINE #2	
VDC	VOLTS DIRECT CURRENT	
VEL	VELOCITY	
VERN	VERNIER	D
VERT	VERTICAL	
VIBN	VIBRATION	
VLV	VALVE	
VS	VERSUS	D

W

(D)	WRG	WIRING
	WT	WEIGHT

X

	X	TRANS
	XCIT	EXCITATION
	XCNGR	EXCHANGER
	XDCR	TRANSDUCER
	XDCR SUP	TRANSDUCER SUPPLY
	XFER SYS	TRANSFER SYSTEM
	XFER	TRANSFER
	XMTR	TRANSMITTER
	XPL	EXPLOSIVE
	XPNDR	TRANSPONDER
(D)	XST	EXHAUST
	XTAL	CRYSTAL
	XVERS	TRANSVERSE
	XVTR	TRANSVERTER

Y

	Y-R	YAW ROLL

Z

(D)	Z	LONGITUDINAL MISSILE AXIS

E SERIES SEQ PEN LIST 06-08-61

SYS	MEAS NO	TYPE	DESCRIPTION	PICK UP	PEN	NO	CPLX
			TIMING PIP		PEN	1	
			SPARE		PEN	2	
S	1372	X	PRESSURIZE VERN TANK	600P110L	PEN	3	11,13
P	1161	X	TCC START SWITCH	P23B8	PEN	4	11,13
P	1549	X	IGNITION START	201U1P100J	PEN	5	11,13
P	1545	X	S IGN STAGE CONTROL	201U1P101B	PEN	6	11,13
P	1544	X	VERNIER CONTROL	201U1P100A	PEN	7	11,13
P	1156	X	B1 TBN OVRSPEED TRIP	600J114F	PEN	8	11,13
P	1157	X	B2 TBN OVRSPEED TRIP	600J114H	PEN	9	11,13
P	1588	X	S TBN OVERSPEED TRIP	201U3P1E	PEN	10	11,13
P	1547	X	B1 CUTOFF RELAY	201U1P100D	PEN	11	11,13
P	1546	X	B2 CUTOFF RELAY	201U1P100C	PEN	12	11,13
P	1347	X	S CUTOFF RELAY	201U1P100F	PEN	13	11,13
P	1785	X	B SECONDARY SHUTDOWN	201U1P100T	PEN	14	13
P	1785	X	B SECONDARY SHUTDOWN	201U1P100T*	PEN	14	11
P	1164	X	TCC ENGINE COF SW	P23B12	PEN	15	11
P	1164	X	TCC ENGINE COF SW	P23B27	PEN	15	13
P	1155	X	OBSERVER CUTOFF	P8A30	PEN	16	11,13
P	1548	X	COMPLETE COF RELY	201U1P100E*	PEN	17	11
P	1548	X	COMPLETE COF RELY	201U1P101V*	PEN	17	13
P	1598	X	VERNIER CUTOFF RELAY	201U1P100E	PEN	18	11,13
			SPARE		PEN	19	

E SERIES SEQ PEN LIST 06-08-61

		SPARE		PEN	20	
		TIMING PIP		PEN	21	
M 1090	X	MSL ONE INCH MOTION	P948D	PEN	22	11,13
N 1335	X	SLG CH LOX DISCH VLV	P101L	PEN	23	11,13
N 1336	X	SLG CH LOX DISCH VLV	200P101P	PEN	24	11,13
N 1337	X	SLG CH LOX INLET VLV	200P101T	PEN	25	11,13
N 1338	X	SLG CH LN2 INLET VLV	200P101R	PEN	26	11,13
N 1339	X	SLG CH GN2 INLET VLV	200P101N	PEN	27	11,13
S 1372	X	PRESSURIZE VERN TANK	600P110L	PEN	28	11
S 1372	X	PRESSURIZE VERN TANK	600U1P3J	PEN	28	13
S 1373	X	BOOSTER CUTOFF	600U1P3C	PEN	29	11,13
S 1374	X	SUSTAINER CUTOFF	600U1P3B	PEN	30	11,13
S 1376	X	VERNIER CUTOFF	600U1P3A	PEN	31	11,13
P 1225	X	ENGINE CONTROL READY	201U1P102A	PEN	32	11,13
P 1226	X	PNEUMATICS CUTOFF	TB102-30	PEN	33	11,13
		SPARE		PEN	34	
		SPARE		PEN	35	
		SPARE		PEN	36	
P 1688	X	VERNIER ENG PURGE	P11W*	PEN	37	11,13
P 1227	X	LOX DOME PURGE	P11K*	PEN	38	11,13
P 1228	X	IGNITER FUEL PURGE	P11V*	PEN	39	11,13
		SPARE		PEN	40	
		TIMING PIP		PEN	41	

E SERIES SEQ PEN LIST 06-08-61

S	1235	X	PROGRAMMER RUN TIME	TB301-187	PEN	42	11,13
S	1370	X	STAGING	600J101K	PEN	43	11
S	1370	X	STAGING	600U1P4AC	PEN	43	13
S	1371	X	BOOSTER JETTISON	600U1P3V	PEN	44	11,13
P	1231	X	LOX 100% SLUG COM	203U4P101A	PEN	45	11,13
P	1229	X	LOX HIGH TOPPING	203U4P101B	PEN	46	11,13
P	1230	X	LOX LOW TOPPING	203U4P101C	PEN	47	11,13
S	1375	X	VSHPS BACKUP SIGNAL	600U1P4P*	PEN	48	11,13
			SPARE		PEN	49	
S	1377	X	EJECT RV UMBILICAL	TB201-31	PEN	50	11,13
S	1378	X	RV JETTISON	600U1P3U	PEN	51	11,13
S	1379	X	FIRE RETRO ROCKETS	600U1P3N	PEN	52	11,13
			SPARE		PEN	53	
N	1335	X	SLG CH LOX DISCH VLV	200P101K	PEN	54	11,13
N	1932	X	LOX TOPPING VLV CLSD	200P101E	PEN	55	11,13
N	1933	X	LOX TOPG VLV OPEN	200P101C	PEN	56	11,13
N	1337	X	SLG CH LOX INLET VLV	200P101S	PEN	57	11,13
N	1336	X	SLG CH LOX VENT VLV	200P101C	PEN	58	11,13
N	1356	X	SLG CH LOX LOW LEVEL	200P101V	PEN	59	11,13
N	1979	X	PRESS VLV CLOSED	200P101M	PEN	60	11,13
			TIMING PIP		PEN	61	
U	1207	X	FUEL 95% PRI CTL	203U4P101X	PEN	62	11,13
U	1206	X	FUEL 95% SEC CTL	203U4P101F*	PEN	63	11,13

E SERIES SEQ PEN LIST 06-08-61

U	1205	X	FUEL 100% PRI CTL	203U4P101G*	PEN	64	11,13
U	1204	X	FUEL 100% SEC CTL	203U4P101Y*	PEN	65	13
U	1204	X	FUEL 100% SEC CTL	203U4P101Y	PEN	65	11
U	1203	X	LOX 95% RAPID LOAD-1	203U4P103E	PEN	66	11
U	1203	X	LOX 95% RAPID LOAD-1	203U4P103H	PEN	66	13
U	1211	X	LOX 95% RAPID LOAD-2	203U4P103F	PEN	67	11
U	1211	X	LOX 95% RAPID LOAD-2	203U4P103G	PEN	67	13
U	1202	X	LOX TOPG LO CTL-1	203U4P103G	PEN	68	11
U	1202	X	LOX TOPG LO CTL-1	203U4P103F	PEN	68	13
U	1210	X	LOX TOPG LO CTL-2	203U4P103H	PEN	69	11
U	1210	X	LOX TOPG LO CTL-2	203U4P103E	PEN	69	13
U	1201	X	LOX TOPG HI CTL-1	203U4P103D	PEN	70	11,13
U	1209	X	LOX TOPG HI CTL-2	203U4P103C	PEN	71	11,13
U	1200	X	LOX 100% SLUG COF-1	203U4P103B	PEN	72	11,13
U	1208	X	LOX 100% SLUG COF-2	203U4P103A	PEN	73	11,13
			SPARE		PEN	74	
H	1187	X	B OIL EVACUATION	TB10-6640	PEN	74	13
			SPARE		PEN	75	
H	1188	X	S OIL EVACUATION	TB10-6641	PEN	75	13
P	1192	X	B1 ROUGH COMB COF	TB98-1Z32	PEN	76	11,13
P	1193	X	B2 ROUGH COMB COF	TB98-1Z33	PEN	77	11,13
P	1438	X	S ROUGH COMB COF	TB98-1Z34	PEN	78	11,13
P	1975	X	B1 RCC BACK-UP RELAY	TB98-1Z35	PEN	79	11,13

E SERIES SEQ PEN LIST 06-08-61

P 1976 X B2 RCC BACK-UP RELAY TB98-1Z36 PEN 80 11,13

*LOWER CASE LETTER

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CONVAIR ASTRONAUTICS

GENERAL DYNAMICS CORPORATION

TPL 2332
3 August 1960

To: All Holders of Report AZC-27-059-3

From: T. M. Wooster - Test Planning

Subject: Instrumentation Configuration Report, Series E, Article 3 (Revision A) dated 7 July 1960

The enclosed revision has been prepared to summarize all the instrumentation changes made since the publication of the original 3-E Report.

It is recommended that this report be physically incorporated in the back of Report AZC-27-059, replacing the superseded pages, in order that holders of the document may have a complete instrumentation configuration document for the E series under a single cover.

The replaced pages are to be destroyed in accordance with existing security regulations.

T. M. Wooster

T. M. Wooster
Instrumentation Planning
578-12

TMW:WSB:prg

Distribution List
Report AZC-27-059-3

NOTE: THIS MEMO TO BE DECLASSIFIED WHEN DETACHED FROM CLASSIFIED DOCUMENT.

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REPORT NO. AZC-27-050-3
DATE 15 March 1960
NO. OF PAGES 40

CONVAIR (ASTRONAUTICS) DIVISION
GENERAL DYNAMICS CORPORATION

WS-107A-1

INSTRUMENTATION CONFIGURATION

SERIES E ARTICLE 3

AMR

PREPARED BY TEST PLANNING

COORDINATED BY W. S. Becker
W. S. Becker

APPROVED BY H. R. Macdonald
H. R. Macdonald
Test Planning

CHECKED BY M. L. Mate for
T. M. Wooster
Instrumentation

APPROVED BY P. J. Lynch
P. J. Lynch
Chief-Field Test
Engineering

GD

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REVISIONS

DATE	BY	CHANGE	PAGES AFFECTED
7 July '60	WSB	ADDITIONS:	
		P1083B, P1084B, P1349B, P1439O,	ALL TABS
		P1452O, P1453O, P1001P, P[illegible]02P,	
		P1003P, P1004P, P155P, P184P, P185P,	
		P188P, P1189P, P1190P, P27[illegible], P34[illegible],	
		P473P, P1020T, P1151T, P1204T, P1205T,	
		P1437W, P1454W, P1455W, P1192X,	
		P1193X, P1438X, P1785X, U1208X,	
		U1209X, U1210X, U1211X	
		Reasons for Revision "A" Changes	4-1
7 July '60	WSB	DELETIONS:	
		P1279P, P1341P, P1473P, P419P, P420P	ALL TABS

FOREWORD

This report has been publ'ihed in accordance with contractual requirements as cited in Convair-Astronautics Report ZM-7-289. It describes the instrumentation released for Missile 3-E as of 30 July 1960. (A)

Information presented here will be used by Air Force, Associate Contractors, Design, Operat'on, and Field Test Groups. Measurement modification will either originate in the Instrumentation Planning Group or will be submitted as a recommendation to this group.

TABLE OF CONTENTS

SUMMARY

The instrumentation configuration for this missile has been established through a study of program test objectives, systems analysis, and operating considerations. A discussion of missile instrumentation and associated characteristics has been summarized in Report AZC-27-059. For a detailed description of the various missile systems, test objectives, and general test program see Report AZC-27-008.

The specific measurements to be transmitted via telemeter have been tabulated and are listed in Sections 8 and 9 in terms of instrumentation system and telemeter channel assignments.

In addition to the telemetry, the landline instrumentation program for this missile has been included in this report in the form of a master tabulation of landline measurement characteristics, (Section 10).

To clarify specific measurements, instrumentation location schematics have been included in Report AZC-27-059, Section 7.

REASONS FOR REVISION "A" CHANGES

I. In order to gain data on the performance of the MA-3 turbopump lube oil and pressurization systems during flight, 3 lube oil pressure measurements were switched from landline to telemetry.

MEAS. NO.	DESCRIPTION	CHANNEL
DELETE:		
P1279P	B2 LO PR LUBE OIL MAN	
P1341P	S LUBE OIL MANIFOLD	
P1473P	B1 LO PR LUBE OIL MAN	
ADD:		
P279P	B2 LO PR LUBE OIL MAN	2.11.43
P341P	S LUBE OIL MANIFOLD	2.11.47
P473P	B1 LO PR LUBE OIL MAN	2.11.45

II. The turbopump speeds, RCC accelerometers and binary counter outputs will be recorded during FRF's to gain data on rough combustion and other thrust chamber and turbopump phenomena. The pump speeds and accelerometers will be recorded on AM tape. Thrust chamber pressure and RCC counter outputs are to be recorded on oscillographs.

ADD:	
P1083B	B2 PUMP SPEED
P1084B	B1 PUMP SPEED
P1349B	S PUMP SPEED
P1439O	S NAA RCC ACCEL
P1452O	B1 NAA RCC ACCEL
P1453O	B2 NAA RCC ACCEL
P1437W	S RCC BINARY COUNTER
P1454W	B1 RCC BINARY COUNTER

MEAS. NO.	DESCRIPTION	CHANNEL
ADD:		
P1455W	B2 RCC BINARY COUNTER	
P185P	B1 TURBOPUMP GEAR BOX	2.11.49
P188P	B2 TURBOPUMP GEAR BOX	2.11.51

III. In order to assure that the orifices have been properly sized in the booster gas generator LO_2 feed lines:

ADD:

P1001P	B1 LO_2 PUMP INLET	
P1002P	B1 FUEL PUMP INLET	
P1003P	B2 LO_2 PUMP INLET	
P1004P	B2 FUEL PUMP INLET	
P1020T	B1 LO_2 PUMP INLET	
P155P	B1 GAS GEN COMBUSTOR	1.12.23
P184P	B2 GAS GEN COMBUSTOR	1.12.33
P1151T	FUEL TK @ STA 1043	

DELETE:

P419P	B1 GG LO_2 INJ MAN
P420T	B2 GG LO_2 INJ MAN

IV. To allow evaluation of revised LO_2 slug system, 2 temperature and 2 pressure measurements have been added:

ADD:

P1189P	B1 GAS GEN LO_2 IN
P1190P	B2 GAS GEN LO_2 IN
P1204T	B1 TOPPING LINE OUT
P1205T	B2 TOPPING LINE OUT

V. IBM difficulties make it desirable to assign different measurement numbers for the new CVA dual LO_2 tanking probes.

MEAS. NO.	DESCRIPTION
ADD:	
U1208X	LO_2 100% SLUG COF-2
U1209X	LO_2 TOPG HI CTL-2
U1210X	LO_2 TOPG LO CTL-2
U1211X	LO_2 95% RAPID LOAD-2

VI. The following rough combustion control cutoff signals will be monitored to ascertain type and timing of shutdown for failure analysis purposes. Measurement P1785X was added to validate the booster secondary shutdown system timer:

ADD:

P1192X	B1 ROUGH COMB CUTOFF
P1193X	B2 ROUGH COMB CUTOFF
P1438X	S ROUGH COMB CUTOFF
P1785X	B SECONDARY SHUTDOWN

SECTION 8

MISSILE INSTRUMENTATION BY SYSTEM

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by system.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

UNITS OF FUNCTION

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings

A	F	1	P	LO_2 TANK HELIUM	1	11	35	0	45	PIA	SLO	7 01723	11		480	2		P	27-11608
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA	SLO	7 01"23	13		925	Y		P	27-11609
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA	SLO	7 01731	3		1243	4		P	27-16500
A	F	260	P	B TANK HE BOTTLES LO	1	11	17	15	415	PIA	SLO	7 01727	1		1238	1		P	27-11600
A	F	261	P	S TANK HE BOTTLE LO	1	11	21	15	415	PIA	SLO	7 01727	1		1223	2		P	27-16505

MEASUREMENT NUMBER

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number assignment for the applicable measurement.

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 9-E REPORT NO. AZC-27-059-3 DATE 07 JUL 60 PAGE 1

1 [illegible]	2 SYSTEM	3 MEASUREMENT NUMBER	4 TYPE MEASUREMENT	5 DESCRIPTION	6 TELEMETER NO	7 SUBC. CARRIER NO.	8 COMMUTATOR SEG NO	9 MEASUREMENT RANGE LOW	9 MEASUREMENT RANGE HIGH	10 UNITS OF FUNCTION	11 ACCURACY	12 RATE OF CHANGE OR FREQUENCY OF FUNCTION	13 TYPE OF TRANSDUCER	14 SERIAL NO.	15 STATION NO.	16 QUADRANT	17 CARD CODE	DRAWING NUMBERS
	A			AIRFRAME														
	A	285	I	THRUST SECT LITE B1	3	11	1						7 01709 1		1220	4	P	27-11733
	A	744	I	THRUST SECT LITE B2	3	11	3						7 01709 1		1220	2	P	27-11733
	A	488	T	AMB F STG VLV Q3	1	11	15	M100	300	DGF		SLO	27 01287 3	1432T	1174	3	P	27-11793
	A	638	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3	1305T	1220	2	P	27-11793
	A	639	T	AMB JET RAIL Q4	1	11	45	M100	300	DGF		SLO	27 01287 3	1269T	1178	4	P	27-11793
	A	640	T	FWD SIDE A FRAME Q4	1	11	31	M100	300	DGF		SLO	7 01287 3	1307T	1205	4	P	27-11793
	A	641	T	AMB F STG VLV Q1	1	11	37	M100	300	DGF		SLC	27 01287 3	1275T	1174	1	P	27-11793
	A	642	T	AMB NEAR B2 GG Q3	1	11	43	M100	300	DGF		SLO	27 01287 3	1270T	1196	3	P	27-11794
	A	645	T	AMB FWD B1 Q4	1	11	33	M100	300	DGF		SL	7 01287 3	1266T	1196	2	P	27-11794
	D			RANGE SAFETY SYSTEM														
	D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC		STP					P	
	D	1	V	RSC CUTOFF OUTPUT	1	6	S	0	31	VDC	-	BLP					M	
	D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	100K	UV		SLO		172			P	
	D	3	X	RSC DESTRUCT OUTPUT	2	E	9S	0	30	VDC		STP					P	
	E			ELECTRICAL POWER SYS														
	E	50	Q	400 CYCLE AC PWRSUP	1	1		370	430	CPS		SLO		1			P	
	E	28	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC		SLO		1			P	
	E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC		SLO		1			P	
	E	53	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC		SLO		1			P	
	F			PNEUMATIC SYSTEM														
	F	1	P	LO2 TANK HELIUM	1	13	33	0	45	PIA		SLO	7 01723 11	3182	484	3	P	27-11679
	F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA		SLO	7 01723 11	2761	948	3	P	27-11683

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 3-E REPORT NO AZC-27-059-3 DATE 07 JUL 60 PAGE 2

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	F	65	P	LO2 TK HE LIN @ ORFC	1	A	51	0	45	PIA		SLO	27 01243 5	1348F	1127	4	P	27-11732
	F	114	P	LO2 PRESS REG INLET	1	13	45	0	3000	PIA		SLO	7 01731 9	5843	1187	4	P	27-11682
	F	145	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA		SLO	7 01720 5	3043	1213	2	P	27-11650
	F	147	P	LO2 PRESS ORFC DP	1	A	49	0	5	PID		SLO	27 01280 1	2800	1127	3	P	27-11732
	F	246	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA		SLO	7 01720 5	3087	1187	4	P	27-11682
	F	260	P	B TK HE BOTTLES LO	1	12	31	0	400	PIA		SLO	7 01727 1	4966	1187	4	P	27-11682
	F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01684 3	362R	1205	4	P	27-11682
	F	146	T	LO2 PRESS ORFC IN	1	11	11	0	500	DGF		SLO	7 01684 3	R115	1121	3	P	27-11732
	F	247	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01633 5	18L	1221	4	P	27-11682
	F	290	T	S CTL HE BOTTLE	1	11	41	M100	100	DGF		SLO	7 01633 7	11L	1235	2	P	27-11650
	G			RADIO GUIDANCE SYS														
	G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA		SLO					P	
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E		SLO					P	
	G	503	V	MOD III PB AGC	1	11	17	0	M4.8	VDC		SLO					P	
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
	H			HYDRAULIC SYSTEM														
	H	37	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA		SLO	7 01731 9	5693	1173	1	P	27-11721
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA		SLO	7 01720 5	4309	1213	2	P	27-11650
	I			INERTIAL GUIDANCE														
	I	513	A	ACCEL XF1 DIRECT	3	C				G							P	
	I	514	A	ACCEL XF2 DIRECT	3	E				G							P	
	I	516	A	ACCELEROMETER YF1	2	A				G							P	
	I	517	A	ACCELEROMETER ZF1	3	13				G							P	
	I	519	A	ACCELEROMETER YF2	2	C				G							P	

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VEHICLE	STATUS	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
	I	520	A	ACCELEROMETER ZF2	3	A				G							P	
	I	549	D	PITCH SERVO ERROR	2	6				DEG							P	
	I	549	D	PITCH SERVO ERROR	2	11	21										M	
	I	550	D	ROLL SERVO ERROR	2	9				DEG							P	
	I	550	D	ROLL SERVO ERROR	2	11	33										M	
	I	551	D	AZIMUTH SERVO ERROR	2	10				DEG							P	
	I	551	D	AZIMUTH SERVO ERROR	2	11	35										M	
	I	552	D	REDNDT GYRO PICK-OFF	2	7				DEG							P	
	I	552	D	REDNDT GYRO PICK-OFF	2	11	23										M	
	I	505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	
	I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
	I	560	O	BINNACLE X AXIS	1	C	1	M10	10	G		800					P	
	I	561	O	BINNACLE Y AXIS	1	C	9	M10	10	G		800					P	
	I	562	O	BINNACLE Z AXIS	1	C	17	M10	10	G		800					P	
	I	564	O	COMPUTER X AXIS	1	C	25	M10	10	G		800					P	
	I	565	O	COMPUTER Y AXIS	1	C	33	M10	10	G		800					P	
	I	566	O	COMPUTER Z AXIS	1	C	41	M10	10	G		800					P	
	I	572	P	BINNACLE	1	12	13										P	
	I	531	T	GYRO 1	1	12	1										P	
	I	532	T	GYRO 2	1	12	3										P	
	I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	

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MISSILE 3-E REPORT NO AZC-27-059-3 DATE 07 JUL 60 PAGE 4

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	I	534	T	ANALOG SIG CONVERTER	1	12	13										P	
	I	535	T	COMPUTER	1	12	19										P	
	I	528	V	YAW STEERING SIG	2	5											P	
	I	528	V	YAW STEERING SIG	2	11	19										M	
	I	529	V	ROLL RESOLVER SIG	2	3											P	
	I	529	V	ROLL RESOLVER SIG	2	11	15										M	
	I	530	V	PITCH RESOLVER SIG	2	4											P	
	I	530	V	PITCH RESOLVER SIG	2	11	17										M	
	I	540	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		SLO					P	
	I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
	I	543	V	COMPUTER M50 PSUP	3	9		M55	0	VDC							P	
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
	I	545	V	COMPUTER M10 PSUP	1	13	41	M12	0	VDC		SLO					P	
	I	547	V	COMPUTER 4 PSUP	1	13	43	0	4.5	VDC		SLO					P	
	I	548	V	COMPUTER 38 PSUP	1	12	41	0	42	VDC		SLO					P	
	I	580	V	AZM RESOLVER SIG	2	8						40					P	
	I	580	V	AZM RESOLVER SIG	2	11	31										M	
	I	510	W	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
	I	581	W	TIME T	2	8	S					BLP					P	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	521	X	VERN ENGINE COF SIG	2	6	S					BLP					P	
	I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	522	X	S ENGINE COF SIG	2	9	S					BLP					P	
	I	523	X	S&V COF RELAYS	2	10	S	OFF	ON			BLP					P	
	I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
	I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
	I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
	I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	M			MISCELLANEOUS														

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MISSILE 3-E REPORT NO AZC-27-059-3 DATE 07 JUL 60 PAGE 5

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No	Quadrant	Calib Code	Drawing Numbers
	M	143	D	BOOSTER SEPARATION	3	7				IN			7 01676 1	VT9			P	
	M	32	X	CONAX VALVE COMMAND	1	A	23	OFF	ON			STP					P	
	M	78	X	STROBE LIGHT OCCUR	1	C	95			VDC		STP					P	
	M	84	X	B STGG LATCH MSW Q1	3	8		OFF	ON				87 44900 109		1145	1	P	
	M	85	X	B STGG LATCH MSW Q2	3	8		OFF	ON				87 44900 109		1145	2	P	
	M	86	X	B STGG LATCH MSW Q3	3	8		OFF	ON				87 44900 109		1145	3	P	
	M	87	X	B STGG LATCH MSW Q4	3	8		OFF	ON				87 44900 109		1145	4	P	
	P			PROPULSION SYSTEM														
	P	798	A	LO2 LINE AXIAL ACCEL	2	12		M60	60	G		100	27 01277 5	370	1111	1	P	27-11787
	P	799	A	LO2 LINE LAT ACCEL	2	13		M60	60	G		100	27 01277 5	369	1111	1	P	27-11787
	P	83	B	B2 PUMP SPEED	1	2		5680	6400	RPM		SLO	27 01267 1	33	1198	2	P	27-11722
	P	84	B	B1 PUMP SPEED	2	2		5680	6400	RPM		SLO	27 01267 1	17	1198	4	P	27-11721
	P	349	B	S PUMP SPEED	1	3		9.9	11.2	KPM		SLO	27 01264 3	35N	1234	3	P	27-11720
	P	528	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG		SLO	NAA				P	
	P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG		SLO	NAA		1205	X	P	27-17564
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA		15	7 01731 5	5154	1235	X	P	27-11720
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA		SLO	7 01720 3	2716	1208	Y	P	27-11651
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA		SLO	7 01737 3	1231	1127	4	P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA		SLO	7 01737 3	1184	1127	2	P	27-11699
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA		SLO	7 01720 3	2082R	1208	Y	P	27-11651
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA		15	7 01731 5	6263	1144	3	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	P91		15	7 01731 5	4835	1173	1	P	27-11721
	P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA		SLO	27 01243 9	L1430	1235	X	P	27-11720
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA		15	7 01731 1	4849	1244	Y	P	27-11684
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA		15	7 01731 1	5269	1244	Y	P	27-11684
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA		SLO	7 01731 5	4726	1244	Y	P	27-11684
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA		SLO	7 01731 5	5057	1244	Y	P	27-11684

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Subcarrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	P	155	P	B1 GAS GEN COMBUSTOR	1	12	23	0	1000	PIA		SLO	7 01731 5				P	
	P	184	P	B2 GAS GEN COMBUSTOR	1	12	33	0	1000	PIA		SLO	7 01731 5				P	
	P	185	P	B1 TURBOPUMP GEARBOX	2	11	49	0	15	PIG		SLO	27 01243 5				P	
	P	188	P	B2 TURBOPUMP GEARBOX	2	11	51	0	15	PIG		SLO	27 01243 5				P	
	P	279	P	B2 LO PR LUB OIL MAN	2	11	43	0	125	PIA		SLO	27 01243 9		1144	3	P	
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA		15	7 01731 7	5735	1235	X	P	27-11720
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA		SLO	7 01731 5	6272	1235	X	P	27-11720
	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA		SLO	7 01731 7		1235	X	P	
	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA		SLO	7 01731 5	6208	1235	X	P	27-11720
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIA		SLO	27 01243 9		1173	1	P	
	P	474	P	V CTL PRESS REG OUT	1	A	15	0	1000	PIA		SLO	7 01720 1	4321	1208	Y	P	27-11651
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	R553	1197	X	P	27-11720
	P	671	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	7 01287 3	1280T	1222	4	P	27-11793
	P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 01247 3	26L	1234	4	P	27-11720
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247 3	35L	1210	1	P	27-11721
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247 3	31L	1210	3	P	27-11722
	P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	P	547	X	B1 CUTOFF RELAY	1	7	5	0	28	VDC		STP					P	
	P	548	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP					P	
	S			AUTOPILOT SYSTEM														
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG		5		14			P	
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG		5		14			P	
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG		5		14			P	
	S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG		10	7 01680 7	969	1212	Y	P	
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG		10	7 01680 7	969	1212	Y	M	27-11721
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG		10	7 01680 7	720	1212	Y	P	27-11722
	S	205	D	B1 YAW	1	6		M5	5	DEG		10	7 01680 7	963	1212	4	P	
	S	205	D	B1 YAW	2	11	5	M5	5	DEG		10	7 01680 7	963	1212	4	M	27-11721
	S	206	D	B2 YAW	2	E	19	M5	5	DEG		10	7 01680 7	716	1212	2	P	27-11722

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
1	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 46	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	73	
	S	222	D	V1 PITCH	2	E	7	0	50	DEG		10	7 014[illegible] 1	07667	1123	4	P	27-11699
	S	223	D	V2 PITCH	2	E	5	0	50	DEG		10	7 01414 1	07700	1123	2	P	27-11699
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG		10	27 01205 1	75	1129	4	P	27-11699
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG		10	27 01205 1	69	1129	2	P	27-11699
	S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG		6	7 01680 9	941	1210	Y	P	
	S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG		6	7 01680 9	941	1210	Y	M	27-11720
	S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG		6	7 01680 3	1007	1210	X	P	
	S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG		6	7 01680 3	1007	1210	X	M	27-11720
	S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S		15		14			P	
	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S		15					M	
	S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S		15		14			P	
	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S		15					M	
	S	54	R	YAW RATE GYRO SIG	1	8		M6	6	D/S		15		14			P	
	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S		15					M	
	S	248	X	RELEASE PAYLOAD	1	13	3	OFF	ON	VDC		TP					P	
	T			TELEMETERING SYSTEM														
	T	2	T	B1 T/C REFER JUNCT	1	11	19	0	200	DGF		SLO	27 01287 1	2146T	1173	1	P	27-11721
	T	3	T	S T/C REFER JUNCT	1	11	23	0	200	DGF		SLO	27 01287 1	2147T	1235	X	P	27-11720
	U			PROPELLANT UTILIZ														
	U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID			27 01280 1	281D	948	3	P	27-11683
	U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID			27 01280 1	339D	948	3	P	27-11683
	U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC		SLO		1			P	
	Y			PAYLOAD SYSTEM														
	Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	[illegible]		STP					P	

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MISSILE 3-E REPORT NO. AZC-27-0 -3 DATE 07 JUL 60 PAGE 8

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Variant	Card Code	Drawing Numbers
	Z			AZUSA SYSTEM														
	Z	2	E	KLYSTRON PWR OUTPUT	1	A1	1					SLO					P	
	Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM		3					P	

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SECTION 9

MISSILE INSTRUMENTATION BY CHANNEL

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by channel.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

UNITS OF FUNCTION

A	P	29	P	V2 THRUST CHAMBER	1	11	5	0	400	PIA		SLO	7	01737	1		1128	2		P	27-11614
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA		SLO	7	01731	3		1243	4		P	27-15500
[illegible]	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA		SLO	7	01723	13		925	Y		P	27-11309
A	P	671	T	TH SECT AMB QUAD 4	1	11	11	100	700	DGF		SLO	7	01684	9		1230	4		P	27-11599

MEASUREMENT NUMBER

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number for the applicable measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 3-E REPORT NO AZC-27-059-3 DATE 07 JUL 60 PAGE 1

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No.	Quadrant	Card Code	Drawing Numbers
				COMM. RATE-CONT.	1	0	Q											
	E	50	Q	400 CYCLE AC PWRSUP	1	1		370	430	CPS		SLO		1			P	
	P	83	B	B2 PUMP SPEED	1	2		5680	6400	RPM		SLO	27 01267 1	33	1198	2	P	27-11722
	P	349	B	S PUMP SPEED	1	3		9.9	11.2	KPM		SLO	27 01264 3	35N	1234	3	P	27-11720
	S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG		6	7 01680 9	941	1210	Y	P	27-11720
	S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG		6	7 01680 3	1007	1210	X	P	27-11720
	S	205	D	B1 YAW	1	6		M5	5	DEG		10	7 01680 7	963	1212	4	P	27-11721
	D	1	V	RSC CUTOFF OUTPUT	1	6	S	0	31	VDC		BLP					M	
	S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG		10	7 01680 7	969	1212	Y	P	27-11721
	P	547	X	B1 CUTOFF RELAY	1	7	S	0	28	VDC		STP					P	
	S	54	R	YAW RATE GYRO SIG	1	8		M6	6	D/S		15		14			P	
	S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S		15		14			P	
	S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S		15		14			P	

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MISSILE 3-E REPORT NO. AZC-27-059-3 DATE 07 JUL 60 PAGE 2

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Number
3	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	73	
				COMM. RATE 2.5 RPS	1	11	0											
	Z	2	E	KLYSTRON PWR OUTPUT	1	11	1					SLO					P	
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E		SLO					P	
	F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01684 3	362R	1205	4	P	27-11682
	G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA		SLO					P	
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	R553	1197	X	P	27-11720
	F	146	T	LO2 PRESS ORFC IN	1	11	11	0	500	DGF		SLO	7 01684 3	R115	1121	3	P	27-11732
	A	638	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3	1305T	1220	2	P	27-11793
	A	488	T	AMB F STG VLV Q3	1	11	15	M100	300	DGF		SLO	27 01287 3	1432T	1174	3	P	27-11793
	G	503	V	MOD III PB AGC	1	11	17	0	M4.8	VDC		SLO					P	
	T	2	T	B1 T/C REFER JUNCT	1	11	19	0	200	DGF		SLO	27 01287 1	2146T	1173	1	P	27-11721
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
	T	3	T	S T/C REFER JUNCT	1	11	23	0	200	DGF		SLO	27 01287 1	2147T	1235	X	P	27-11720
				100% CALIB	1	11	25											
				0% CALIB	1	11	27											
				0% CALIB	1	11	29											
	A	640	T	FWD SIDE A FRAME Q4	1	11	31	M100	300	DGF		SLO	7 01287 3	1307T	1205	4	P	27-11793
	A	645	T	AMB FWD B1 Q4	1	11	33	M100	300	DGF		SL	7 01287 3	1266T	1196	2	P	27-11754
	F	247	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01533 5	18L	1221	4	P	27-11682
	A	641	T	AMB F STG VLV Q1	1	11	37	M100	300	DGF		SLO	27 01287 3	1275T	1174	1	P	27-11793
	P	671	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	7 01287 3	1280T	1222	4	P	27-11793
	F	290	T	S CTL HE BOTTLE	1	11	41	M100	100	DGF		SLO	7 01633 7	11L	1235	2	P	27-11650
	A	642	T	AMB NEAR B2 GG Q3	1	11	43	M100	300	DGF		SLO	27 01287 3	1270T	1196	3	P	27-11794
	A	639	T	AMB JET RAIL Q4	1	11	45	M100	300	DGF		SLO	27 01287 3	1269T	1178	4	P	27-11793
	G	503	V	CONNECTED TO 1 11 17	1	11	47											
					1	11	49											
	G	579	V	CONNECTED TO 1 11 21	1	11	51											
					1	11	53											
				SYNC & 100% CALIB	1	11	55											
				CONNECTED TO 1 11 55	1	11	56											
				CONNECTED TO 1 11 56	1	11	57											
				CONNECTED TO 1 11 57	1	11	58											
				CONNECTED TO 1 11 58	1	11	59											

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Subcarrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Number
				COMM. RATE 5 RPS	1	12	0											
	I	531	T	GYRO 1	1	12	1										P	
	I	532	T	GYRO 2	1	12	3										P	
	I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
					1	12	7											
					1	12	9											
	I	540	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		SLO					P	
	I	534	T	ANALOG SIG CONVERTER	1	12	13										P	
	I	572	P	BINNACLE	1	12	15										P	
	F	145	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA		SLO	7 01720 5	3043	1213	2	P	27-11650
	I	535	T	COMPUTER	1	12	19										P	
	I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
	P	155	P	B1 GAS GEN COMBUSTOR	1	12	23	0	1000	PIA		SLO	7 01731 5				P	
				100% CALIB	1	12	25											
				0% CALIB	1	12	27											
				50% CALIB	1	12	29											
	F	260	P	B TK HE BOTTLES LC	1	12	31	0	400	PIA		SLO	7 01727 1	4966	1187	4	P	27-11682
	P	134	P	B2 GAS GEN COMBUSTOR	1	12	33	0	1000	PIA		SLO	7 01731 5				P	
	I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
	P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG		SLO	NAA		1205	X	P	27-17564
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
	I	548	V	COMPUTER 38 PSUP	1	12	41	0	42	VDC		SLO					P	
	H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA		SLO	7 01731 9	5693	1173	1	P	27-11721
	I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
	I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA		SLO	7 01720 5	4309	1213	2	P	27-11650
	F	246	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA		SLO	7 01720 5	3087	1187	4	P	27-11682
				SYNC & 100% CALIB	1	12	55											
				CONNECTED TO 1 12 55	1	12	56											
				CONNECTED TO 1 12 56	1	12	57											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB... NO	COMMUTATOR	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				CONNECTED TO 1 12 57	1	12	58											
				CONNECTED TO 1 12 58	1	12	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNIT OF FUNCTION	ACCURACY	DATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 5 RPS	1	13	0											
					1	13	1											
	S	248	X	RELEASE PAYLOAD	1	13	3	OFF	ON	VDC		STP					P	
	P	548	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP					P	
	D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC		STP					P	
	P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	E	28	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC		SLO		1			P	
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA		SLO	7 01720 3	2032R	1208	Y	P	27-11651
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA		SLO	7 01731 5	5057	1244	Y	P	27-11684
	P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA			27 01243 9	L1430	1235	X	P	27-11720
					1	13	19											
	U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID			27 01280 1	339D	948	3	P	27-11683
	E	53	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC		SLO		1			P	
				100% CALIB	1	13	25											
				0% CALIB	1	13	27											
				50% CALIB	1	13	29											
	U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID			27 01280 1	281D	948	3	P	27-11683
	F	1	P	LO2 TANK HELIUM	1	13	33	0	5	PIA		SLO	7 01723 11	3122	484	3	P	27-11679
					1	13	35											
	F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA		SLO	7 01723 13	2761	948	3	P	27-11683
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA		SLO	7 01731 5	4726	1244	Y	P	27-11684
	I	545	V	COMPUTER M10 PSUP	1	13	41	M 2	0	VDC		SLO					P	
	I	547	V	COMPUTER 4 PSUP	1	13	43	0	4.5	VDC		SLO					P	
	F	114	P	LO2 PRESS REG INLET	1	13	45	0	3000	PIA		SLO	7 01731 9	5843	1187	4	P	27-11682
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA		SLO	7 01720 3	2716	1208	Y	P	27-11651
	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA		SLO	7 01731 5	6208	1235	X	P	27-11720
					1	13	51											
	E	53	V	CONNECTED TO 1 13 23	1	13	53											
				SYNC & 100% CALIB	1	13	55											
				CONNECTED TO 1 13 55	1	13	56											
				CONNECTED TO 1 13 56	1	13	57											
				CONNECTED TO 1 13 57	1	13	58											
				CONNECTED TO 1 13 58	1	13	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CALIB CODE	DRAWING NUMBERS
				COMM. RATE 10 RPS	1	A	0											
	E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC		SLO		1			P	
	D	7	V	#1 RSC RF INPUT/AGC	1	A	3	15	100K	UV		SLO		172			P	
	U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC		SLO		1			P	
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG		5		14			P	
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG		5		14			P	
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG		3		14			P	
	P	474	P	V CTL PRESS REG OUT	1	A	15	0	1000	PIA		SLO	7 01720 1	4321	1208	Y	P	27-11651
	Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM		3					P	
	Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
					1	A	21											
	M	32	X	CONAX VALVE COMMAND	1	A	23	OFF	ON			STP					P	
				100% CALIB	1	A	25											
				0% CALIB	1	A	27											
				50% CALIB	1	A	29											
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA		SLO	7 01731 5	6272	1235	Y	P	27-11720
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA		SLO	7 01737 3	1231	1127	4	P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA		SLO	7 01737 3	1184	1127	2	P	27-11699
	U	91	V	CONNECTED TO 1 A 7	1	A	37											
	S	61	D	CONNECTED TO 1 A 9	1	A	39											
	S	62	D	CONNECTED TO 1 A 11	1	A	41											
	S	63	D	CONNECTED TO 1 A 13	1	A	43											
	P	528	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG		SLO	NAA				P	
	Z	3	E	CONNECTED TO 1 A 17	1	A	47											
	F	147	P	LO2 PRESS ORFC DP	1	A	49	0	5	PID		SLO	27 01280 1	2800	1127	3	P	27-11732
	F	65	P	LO2 TK HE LIN @ ORFC	1	A	51	0	45	PIA		SLO	27 01243 5	1346	1127	4	P	27-11732
	M	32	X	CONNECTED TO 1 A 23	1	A	53											
				SYNC & 100% CALIB	1	A	55											
				CONNECTED TO 1 A 55	1	A	56											
				CONNECTED TO 1 A 56	1	A	57											
				CONNECTED TO 1 A 57	1	A	58											
				CONNECTED TO 1 A 58	1	A	59											

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1 Vehicle	2 System	3 Measurement Number	4 Type Measurement	5 Description	6 Telemeter No.	7 Sub-Carrier No.	8 Commutator Pin No.	9 Measurement Range Low	9 Measurement Range High	10 Units of Function	11 Accuracy	12 Rate of Change or Frequency of Function	13 Type of Transducer	14 Serial No.	15 Station No.	16 Quadrant	17 Card Code	Drawing Numbers
				COMM. RATE 1/8 RPS	1	C	0											
	I	560	0	BINNACLE X AXIS	1	C	1	M10	10	G		800					P	
	I	560	0	CONNECTED TO 1 C 1	1	C	2											
	I	560	0	CONNECTED TO 1 C 2	1	C	3											
	I	560	0	CONNECTED TO 1 C 3	1	C	4											
	I	560	0	CONNECTED TO 1 C 4	1	C	5											
	I	560	0	CONNECTED TO 1 C 5	1	C	6											
	I	560	0	CONNECTED TO 1 C 6	1	C	7											
	I	561	0	BINNACLE Y AXIS	1	C	9	M10	10	G		800					P	
	I	561	0	CONNECTED TO 1 C 9	1	C	10											
	I	561	0	CONNECTED TO 1 C 10	1	C	11											
	I	561	0	CONNECTED TO 1 C 11	1	C	12											
	I	561	0	CONNECTED TO 1 C 12	1	C	13											
	I	561	0	CONNECTED TO 1 C 13	1	C	14											
	I	561	0	CONNECTED TO 1 C 14	1	C	15											
	I	562	0	BINNACLE Z AXIS	1	C	17	M10	10	G		800					P	
	I	562	0	CONNECTED TO 1 C 17	1	C	18											
	I	562	0	CONNECTED TO 1 C 18	1	C	19											
	I	562	0	CONNECTED TO 1 C 19	1	C	20											
	I	562	0	CONNECTED TO 1 C 20	1	C	21											
	I	562	0	CONNECTED TO 1 C 21	1	C	22											
	I	562	0	CONNECTED TO 1 C 22	1	C	23											
	I	564	0	COMPUTER X AXIS	1	C	25	M10	10	G		800					P	
	I	564	0	CONNECTED TO 1 C 25	1	C	27											
	I	564	0	CONNECTED TO 1 C 27	1	C	29											
	I	564	0	CONNECTED TO 1 C 29	1	C	31											
	I	565	0	COMPUTER Y AXIS	1	C	33	M10	10	G		800					P	
	I	565	0	CONNECTED TO 1 C 33	1	C	35											
	I	565	0	CONNECTED TO 1 C 35	1	C	37											
	I	565	0	CONNECTED TO 1 C 37	1	C	39											
	I	566	0	COMPUTER Z AXIS	1	C	41	M10	10	G		800					P	
	I	566	0	CONNECTED TO 1 C 41	1	C	43											
	I	566	0	CONNECTED TO 1 C 43	1	C	45											

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
	I	566	O	CONNECTED TO 1 C 45	1	C	47											
				0% CALIB	1	C	49											
				50% CALIB	1	C	51											
				100% CALIB	1	C	53											
				SYNC & 100% CALIB	1	C	55											
				CONNECTED TO 1 C 55	1	C	56											
				CONNECTED TO 1 C 56	1	C	57											
				CONNECTED TO 1 C 57	1	C	58											
				CONNECTED TO 1 C 58	1	C	59											
	M	78	X	STROBE LIGHT OCCUR	1	C	95			VDC		STP					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No.	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No.	Quadrant	Card Code	Drawing Numbers
				DIGITAL CHANNEL	1	E	0											
	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
	I	510	W	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
	I	505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
	I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS	AC[illegible]	RATE OF CHANGE	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE CONT.	2	0	0											
	3				2	1												
	P	84	B	B1 PUMP SPEED	2	2		5680	6400	RPM		SLO	27 01267	17	1196	4	P	27-11721
	I	529	V	ROLL RESOLVER SIG	2	3											P	
	I	530	V	PITCH RESOLVER SIG	2	4											P	
	I	528	V	YAW STEERING SIG	2	5											P	
	I	549	D	PITCH SERVO ERROR	2	6				DEG							P	
	I	521	X	VERN ENGINE COF SIG	2	6	S					BLP					P	
	I	552	D	REDNDT GYRO PICK-OFF	2	7				DEG							P	
	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
	I	580	V	AZM RESOLVER SIG	2	8						40					P	
	I	581	W	TIME T	2	8	S					BLP					P	
	I	550	D	ROLL SERVO ERROR	2	9				DEG							P	
	I	522	X	S ENGINE COF SIG	2	9	S					BLP					P	
	I	551	D	AZIMUTH SERVO ERROR	2	10				DEG							P	
	I	523	X	S&V COF RELAYS	2	10	S	OFF	ON			BLP					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
				COMM. RATE 2.5 RPS	2	11	0											
	S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG		6	7 01680 9	941	1210	Y	M	
	S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG		6	7 01680 3	1007	1210	X	M	
	S	205	D	B1 YAW	2	11	5	M5	5	DEG		10	7 01680 7	963	1212	4	M	
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG		10	7 01680 7	969	1212	Y	M	
	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S		15					M	
	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S		15					M	
	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S		15					M	
	I	529	V	ROLL RESOLVER SIG	2	11	15										M	
	I	530	V	PITCH RESOLVER SIG	2	11	17										M	
	I	528	V	YAW STEERING SIG	2	11	19										M	
	I	549	D	PITCH SERVO ERROR	2	11	21										M	
	I	552	D	REDNDT GYRO PICK-OFF	2	11	23										M	
				100% CALIB	2	11	25											
				0% CALIB	2	11	27											
				50% CALIB	2	11	29											
	I	580	V	AZM RESOLVER SIG	2	11	31										M	
	I	550	D	ROLL SERVO ERROR	2	11	33										M	
	I	551	D	AZIMUTH SERVO ERROR	2	11	35										M	
					2	11	37											
					2	11	39											
					2	11	41											
	P	279	P	B2 LO PR LUB OIL MAN	2	11	43	0	125	PIA		SLO	27 01249 9		1144	3	P	
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIA		SLO	27 01249 9		1173	1	P	
	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA		SLO	7 01731 7		1235	X	P	
	P	185	P	B1 TURBOPUMP GEARBOX	2	11	49	0	15	PIG		SLO	27 01243 5				P	
	P	188	P	B2 TURBOPUMP GEARBOX	2	11	51	0	15	PIG		SLO	27 01243 5				P	
					2	11	53											
				SYNC & 100% CALIB	2	11	55											
				CONNECTED TO 2 11 55	2	11	56											
				CONNECTED TO 2 11 56	2	11	57											
				CONNECTED TO 2 11 57	2	11	58											
				CONNECTED TO 2 11 58	2	11	59											

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
				COMM. RATE CONT.	2	12	0											
	P	798	A	LO2 LINE AXIAL ACCEL	2	12		M60	60	G		100	27 01277 5	370	1111	1	P	27-11787
	P	799	A	LO2 LINE LAT ACCEL	2	13		M60	60	G		100	27 01277 5	369	1111	1	P	27-11787
	I	516	A	ACCELEROMETER YF1	2	A				G							P	
	I	519	A	ACCELEROMETER YF2	2	C				G							P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 3-E REPORT NO. AZC-27-059-3 DATE 07 JUL 60 PAGE 13

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
				COMM. RATE 30 RPS	2	E	0											
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA		15	7 01731 5	5154	1235	X	P	27-11720
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA		15	7 01731 7	5735	1235	X	P	27-11720
	S	223	D	V2 PITCH	2	E	5	0	50	DEG		10	7 01414 1	07700	1123	2	P	27-11699
	S	222	D	V1 PITCH	2	E	7	0	50	DEG		10	7 01414 1	07667	1123	4	P	27-11699
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA		15	7 01731 1	5269	1244	Y	P	27-11684
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA		15	7 01731 1	4849	1244	Y	P	27-11684
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG		10	27 01205 1	75	1129	4	P	27-11699
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG		10	7 01680 7	720	1212	Y	P	27-11722
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG		10	27 01205 1	69	1129	2	P	27-11699
	S	206	D	B2 YAW	2	E	19	M5	5	DEG		10	7 01680 7	716	1212	2	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	P91		15	7 01731 5	4835	1173	1	P	27-11721
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA		15	7 01731 5	6263	1144	3	P	27-11722
				100% CALIB	2	E	25											
				0% CALIB	2	E	27											
				50% CALIB	2	E	29											
	P	6	P	CONNECTED TO 2 E 1	2	E	31											
	P	330	P	CONNECTED TO 2 E 3	2	E	33											
	S	223	D	CONNECTED TO 2 E 5	2	E	35											
	S	222	D	CONNECTED TO 2 E 7	2	E	37											
	P	60	P	CONNECTED TO 2 E 9	2	E	39											
	P	59	P	CONNECTED TO 2 E 11	2	E	41											
	S	233	D	CONNECTED TO 2 E 13	2	E	43											
	S	204	D	CONNECTED TO 2 E 15	2	E	45											
	S	234	D	CONNECTED TO 2 E 17	2	E	47											
	S	206	D	CONNECTED TO 2 E 19	2	E	49											
	P	39	P	CONNECTED TO 2 E 21	2	E	51											
	P	38	P	CONNECTED TO 2 E 23	2	E	53											
				SYNC 6 100% CALIB	2	E	55											
				CONNECTED TO 2 E 55	2	E	56											
				CONNECTED TO 2 E 56	2	E	57											
				CONNECTED TO 2 E 57	2	E	58											
				CONNECTED TO 2 E 58	2	E	59											
	D	3	X	RSC DESTRUCT OUTPUT	2	E	95	0	30	VDC		STP					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Calib Code	Drawing Numbers
				COMM. RATE CONT.	3	0	0											
	M	143	D	BOOSTER SEPARATION	3	7				IN			7 01676 1	VT9			P	
	M	84	X	B STGG LATCH MSW Q1	3	8		OFF	ON				87 44900 109		1145	1	P	
	M	85	X	B STGG LATCH MSW Q2	3	8		OFF	ON				87 44900 109		1145	2	P	
	M	86	X	B STGG LATCH MSW Q3	3	8		OFF	ON				87 44900 109		1145	3	P	
	M	87	X	B STGG LATCH MSW Q4	3	8		OFF	ON				87 44900 109		1145	4	P	
	I	543	V	COMPUTER M50 PSUP	3	9		M55	0	VDC							P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No.	Quadrant	Card Code	Drawing Numbers
				COMM. RATE 2.5 RPS	3	11	0											
	A	285	I	THRUST SECT LITE B1	3	11	1						7 01709 1		1220	4	P	27-11733
	A	744	I	THRUST SECT LITE B2	3	11	3						7 01709 1		1220	2	P	27-11733
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247 3	35L	1210	1	P	27-11721
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247 3	31L	1210	3	P	27-11722
	P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 01247 3	26L	1234	4	P	27-11720
					3	11	11											
					3	11	13											
					3	11	15											
					3	11	17											
					3	11	19											
					3	11	21											
					3	11	23											
				100% CALIB	3	11	25											
				0% CALIB	3	11	27											
				0% CALIB	3	11	29											
					3	11	31											
					3	11	33											
					3	11	35											
					3	11	37											
					3	11	39											
					3	11	41											
					3	11	43											
					3	11	45											
					3	11	47											
					3	11	49											
					3	11	51											
					3	11	53											
				SYC & 100% CALIB	3	11	55											
				CONNECTED TO 3 11 55	3	11	56											
				CONNECTED TO 3 11 56	3	11	57											
				CONNECTED TO 3 11 57	3	11	58											
				CONNECTED TO 3 11 58	3	11	59											

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MISSILE INSTRUMENTATION LOG SHEET

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE CONT.	2	13	0											
	I	517	A	ACCELEROMETER ZF1	2	-				-							P	
	I	520	A	ACCELEROMETER ZF2	3	A											P	
	I	513	A	ACCEL XF1 DIRECT	3	C				G							P	
	I	514	A	ACCEL XF2 DIRECT	3	E				G							P	

SECTION 10

LANDLINE INSTRUMENTATION

The Landline Instrumentation presented in this section contains the latest available characteristics of the individual measurements. In addition the type of recordings indicated.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

UNITS OF FUNCTION

FREQUENCY RESPONSE

Denotes the frequency response requirements in cps of the instrumentation system for the measurement.

TRANSDUCER SERIAL NUMBER

A	F	1125	P	B CTL PNEU REG OUT	S	200	800	PIA	16	SLO	7	01731	3	2841	1243 4	27-16500
A	F	1194	P	FACILITY GN_2 SUPPLY	S	0	2400	PIG	48	SLO						
A	F	1388	P	ST PNEU REG OUT	S	0	800	PIA	10	SLO	7	01720	1		1223 2	27-16505
A	G	1026	V	PITCH ANALOG	D	M3C	30	VDC	0.2	SLO						27-0001-3

MEASUREMENT NUMBER

ACCURACY REQUIREMENT

Present in units of the function measured.

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

RECORDER ASSIGNMENT

This code defines the method to be utilized to record the measurement. A double letter here indicates that this measurement will be recorded on two different types of recorders.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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MISSILE 3E LANDLINE REPORT NO. AZC-27-059-3 DATE 07 JUL 60 PAGE 1

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
	D			RANGE SAFETY SYSTEM														
	D	M142	V	RSC #1 BAT DC													P	
	D	M143	V	RSC #2 BAT DC													P	
	D	M140	W	COMMAND #1 TOTAL		M		0	1000	HR							P	
	D	M141	W	COMMAND #2 TOTAL		M		0	1000	HR							P	
	D	M150	W	COM #1 & 2 BATTERY		M		0	1000	HR							P	
	E			ELECTRICAL POWER SYS														
	E	M066	C	MISSILE DC AMPS		M		0	200	AMP							P	
	E	M068	C	EMERGENCY GENERATOR		M		0	200	AMP							P	
	E	M005	Q	MISSILE INT PHASE A		M		396	404	CPS							P	
	E	M029	Q	MISSILE EXT PHASE A		M		396	404	CPS							P	
	E	M031	Q	PHASE A EXT @ MSL		M		396	404	CPS							P	
	E	M003	V	MISSILE INTERNAL DC		M		0	40	VDC							P	
	E	M006	V	MISSILE INTERNAL AC		M		110	120	VAC							P	
	E	M022	V	MISSILE AC EXT @ MSL		M		110	120	VAC							P	
	E	M023	V	MISSILE EXTERNAL AC		M		110	120	VAC							P	
	E	M030	V	MISSILE DC EXT @ MSL		M		0	40	VDC							P	
	E	M065	V	MISSILE EXTERNAL DC		M		0	40	VDC							P	
	E	M109	W	MAIN MSL BATT TIMER		M											P	
	E	M110	W	INVERTER TIMER		M											P	
	F			PNEUMATIC SYSTEM														
	F	1001	P	LO2 TANK HELIUM		O		0	50	PIG	1	SLO	27 01243 5	A2123	484	3	P	27-11679
	F	M001	P	LO2 TANK HELIUM		M		0	30	PIG			27 01243 5	A2123	484	3	P	27-11679
	F	1003	P	FUEL TANK HELIUM		O		0	75	PIG	1	SLO	27 01243 7	00015	948	3	P	27-11683

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 3E LANDLINE   REPORT NO. AZC-27-059-3   DATE 07 JUL 60   PAGE 2

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
	F	M003	P	FUEL TANK HELIUM		M		0	75	PIG			27 01243 7	00015	948	3	P	27-11683
	F	M032	P	LN2 PRESSURE		M		0	4000	PIG							P	
	F	M053	P	NORM SUP PRESSURE		M		0	4000	PIG							P	
	F	M054	P	EMERG SUP PRESSURE		M		0	4000	PIG							P	
	F	M116	P	DIFFERENTIAL PRESS		M		0	5	PID							P	
	F	1145	P	S CTL HE BTL DISCH		S		0	3500	PIA	105	SLO	7 01720 5		1213	2	P	27-11650
	F	M145	P	S CTL HE BTL DISCH		M		0	3500	PIG	105	SLO	7 01720 5	4313	1213	2	P	27-11650
	F	1194	P	FACILITY GN2 SUPPLY		S		0	2400	PIG	48	SLO					P	
	F	1246	P	B TANK HE BOTTLES HI		S		0	3250	PIA	65	SLO	7 01720 5	5630	1200	4	P	27-11682
	F	M246	P	B TANK HE BOTTLES HI		M		0	4000	PIG			7 01720 5	5630	1200	4	P	27-11682
	F	M248	P	S TANK HE BOTTLES HI		M		0	3250	PIA	65	20					P	
	F	M247	T	BSTR TANK TEMP		M		M80	M380	DGF			7 01633 5	18L	1221	4	P	27-11682
	F	M290	T	SUST CTL TEMP		M		M100	M200	DGF			7 01633 7	11L	1235	2	P	27-11650
	I			INERTIAL GUIDANCE														
	I	1515	A	ACCELEROMETER X F1		F											P	
	I	1516	A	ACCELEROMETER Y F1		F											P	
	I	1517	A	ACCELEROMETER Z F1		F											P	
	I	1518	A	ACCELEROMETER X F2		F											P	
	I	1519	A	ACCELEROMETER Y F2		F											P	
	I	1520	A	ACCELEROMETER Z F2		F											P	
	I	1591	C	PITCH GYRO TORQUE		D		M75	75	MA							P	
	I	1592	C	ROLL GYRO TORQUE		D		M75	75	MA							P	
	I	1593	C	YAW GYRO TORQUE		D		M75	75	MA							P	
	I	1594	D	PENDULUM #1 NULL		D	4	M20	20	MIN							P	
	I	1595	D	PENDULUM #2 NULL		D	5	M20	20	MIN							P	
	I	1596	D	OPTIC SIGNAL		D	6	M7.5	7.5	MIN							P	
	I	1505	H	COMPUTER POSITION X		F		0	6K	NM		105					P	
	I	1506	H	COMPUTER POSITION Y		F		M300	500	NM		10K					P	
	I	1507	H	COMPUTER POSITION Z		F		0	700	NM		10K					P	

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MISSILE 3E LANDLINE REPORT NO AZC-27-059-3 DATE 07 JUL 60 PAGE 3

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	I	1508	H	RANGE ERROR FUNCTION		F		0	6K	NM		10K					P	
	I	1509	H	AZM ERROR FUNCTION		F		M300	0500	NM		10K					P	
	I	1502	L	COMPUTER VELOCITY X		F		0	22K	F/S		10K					P	
	I	1503	L	COMPUTER VELOCITY Y		F		0	4K	F/S		10K					P	
	I	1504	L	COMPUTER VELOCITY Z		F		0	6K	F/S		10K					P	
	I	1601	V	400 CPS REFERENCE		D											P	
	I	1510	W	ELAPSED TIME		F											P	
	I	1521	X	VERN ENGINE COF SIG		D		ON	OFF				PEN 14				P	
	I	1522	X	S ENGINE COF SIG		D		ON	OFF				PEN 19				P	
	I	1570	X	STAGING SIG		D		ON	OFF								P	
	I	1603	X	WORD GATE FIVE		F		ON	OFF								P	
	I	1604	X	MULT GATE SIX		F		ON	OFF								P	
	I	1605	X	112 CPS GATE		F		ON	OFF								P	
	L			LAUNCHER														
	L	1398	D	MSL VS DISCON Q1 & 2		O		M1.0	2.0	IN	0.1	50					P	
	L	1399	D	MSL VS DISCON Q3&4		O		M1.0	2.0	IN	0.1	50					P	
	L	1401	S	HD HOOK STRAIN Q1		O		0	100	KSI	3.0	SLO					P	
	L	1402	S	HD HOOK STRAIN Q2		O		0	100	KSI	3.0	SLO					P	
	L	1405	T	L PED INNER FACE Q1		S		0	1200	DGF	25	SLO					P	
	L	1407	T	L PED INNER FACE Q3		S		0	1200	DGF	25	SLO					P	
	L	1415	T	Q1 PEDESTAL DELTA T		S		0	600	DGF	25	SLO					P	
	L	1416	T	Q3 PEDESTAL DELTA T		S		0	600	DGF	25	SLO					P	
	M			MISCELLANEOUS														
	M	M144	V	STROBELIGHT BATTERY		H											P	
	M	1090	X	MSL ONE INCH MOTION		R		OFF	ON								P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	N	M362	D	36 INCH WATER VALVE		M											P	
	N	3301	P	SLUG CH GN2 IN VTRI		V		50	350	P/M		SLO					P	
	N	1309	P	SLUG CHILL LO2 INLET		S		0	100	PIG		SLO					P	
	N	1310	P	SLUGCHILL LO2 DISCH		S		0	500	PIG		SLO					P	
	N	1311	P	SLUG CHILL GN2 ULL		S		0	75	PIG		SLO					P	
	N	1313	T	SLUGCHILL LO2 INLET		S		M250	M325	DGF		SLO					P	
	N	1314	T	SLUGCHILL LO2 DISCH		S		M250	M325	DGF		SLO					P	
	N	1335	X	SLG CH LO2 DISCH VLV		R		OPEN	CLOS			SLO					P	
	N	1336	X	SLG CH LO2 VENT VLV		R		OPEN	CLOS			SLO					P	
	N	1337	X	SLG CH LO2 INLET VLV		R		OPEN	CLOS			SLO					P	
	N	1338	X	SLG CH LN2 INLET VLV		R		OPEN	CLOS			SLO					P	
	N	1339	X	SLG CH GN2 INLET VLV		R		OPEN	CLOS			SLO					P	
	P			PROPULSION SYSTEM														
	P	1083	B	B2 PUMP SPEED		A		5680	6400	RPM	60	SLO					P	
	P	1084	B	B1 PUMP SPEED		A		5680	6400	RPM	60	SLO					P	
	P	M242	B	PUMP LC SPEED		M		0	100	PCT							P	
	P	1349	B	S PUMP SPEED		A		9.9	11.2	KPM	.1	SLO					P	
	P	1528	D	S MAIN FUEL VALVE		S		0	87.5	DEG	2	SLO	NAA				P	
	P	M685	M	FUEL IN MISSILE		M		0	K100	GAL							P	
	P	1439	O	S NAA RCC ACCEL		F		0	200	G	5	10K					P	
	P	1452	O	B1 NAA RCC ACCEL		F		0	200	G	5	2K					P	
	P	1453	O	B2 NAA RCC ACCEL		F		0	200	G	5	2K					P	
	P	1001	P	B1 LO2 PUMP INLET		O		0	150	PIA		SLO	27 01243 9				P	
	P	1002	P	B1 FUEL PUMP INLET		O		0	150	PIA		SLO	27 01243 9				P	

[redacted]

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 3E LANDLINE   REPORT NO AZC-27-059-3   DATE 07 JUL 60   PAGE 5

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Number
	P	1003	P	B2 LO2 PUMP INLET		O		0	150	PIA		SLO	27 01243 9				P	
	P	1004	P	B2 FUEL PUMP INLET		O		0	150	PIA		SLO	27 01243 9				P	
	P	1010	P	B1 LUBE OIL INJ MAN		S		0	1000	PIA	50	SLO	7 01731 7	6098	1173	1	P	27-11721
	P	1011	P	B2 LUBE OIL INJ MAN		S		0	1000	PIA	50	SLO	7 01731 7	5587	1144	3	P	27-11722
	P	1189	P	B1 GAS GEN LO2 IN		O		0	1000	PIA		1K	7 01728 801				P	
	P	1190	P	B2 GAS GEN LO2 IN		O		0	1000	PIA		1K	7 01728 801				P	
	P	1232	P	S LO2 SEAL CAVITY		S		0	15	PIG	2	SLO	27 01243 5	2656F	1235	X	P	27-11720
	P	M373	P	LO2 STORAGE TANK		M		0	50	PIG							P	27-11720
	P	1465	P	S LO PR LUBE OIL MAN		S		0	150	PIA		SLO	27 01243 9	L1539	1235	X	P	27-11720
	P	1474	P	V CTL PRESS REG OUT		S		200	800	PIA	16	SLO	7 01731 3	5007	1208	Y	P	27-11651
	P	1020	T	B1 LO2 PUMP INLET		S		M325	M275	DGF		SLO	7 01649 9				P	
	P	1151	T	FUEL TK @ STA 1043		S		0	200	DGF	5	SLO	7 01684 13				P	
	P	1204	T	B1 TOPPING LINE OUT		O		M300	M270	DGF		20	7 01649 7				P	
	P	1205	T	B2 TOPPING LINE OUT		O		M300	M270	DGF		20	7 01649 7				P	
	P	1325	T	ENG COMP AMBIENT		S		M100	500	DGF	3	SLO	7 01684 5	270R	1208	Y	P	27-11651
	P	1709	T	SGG COMBUSTOR		S		0	1500	DGF		5	27 01247 3		1234	4	P	
	P	1710	T	SE ENVIRONMENT		S		M100	500	DGF		SLO	7 01684 5	123R	1235	3	P	27-17540
	P	1711	T	B1 NACELLE AMBIENT		S		M100	500	DGF		SLO	7 01684 5	125R	1204	4	P	27-17546
	P	1712	T	B2 NACELLE AMBIENT		S		M100	500	DGF		SLO	7 01684 5	165R	1204	2	P	27-17546
	P	1713	T	B1 GAS GEN COMBUSTOR		S		0	1500	DGF	30	5	27 01247 3		1210	1	P	
	P	1714	T	B2 GAS GEN COMBUSTOR		S		0	1500	DGF	30	5	27 01247 3		1210	3	P	
	P	1437	W	S RCC BINARY COUNTER		O		0	100	MS	1	1KC					P	
	P	1454	W	B1 RCC BINARY COUNTR		O		0	100	MS	1	1KC					P	
	P	1455	W	B2 RCC BINARY COUNTR		O		0	100	MS	1	1KC					P	
	P	M849	W	LO2 SLUG XFER & FIRE		M											P	
	P	1155	X	OBSERVER CUTOFF		R		OFF	ON	VDC		STP	PEN 16				P	
	P	1161	X	TCC START SWITCH		R		OFF	ON	VDC		STP	PEN 4				P	
	P	1164	X	TCC ENGINE COF SW		R		OFF	ON	VDC		STP	PEN 15				P	
	P	1192	X	B1 ROUGH COMB COF		R		OFF	ON	VDC		STP	PEN 76				P	
	P	1193	X	B2 ROUGH COMB COF		R		OFF	ON	VDC		STP	PEN 77				P	

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 3E LANDLINE REPORT NO. AZC-27-059-3 DATE 07 JUL 60 PAGE 6

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	P	1347	X	S CUTOFF RELAY		R		OFF	ON	VDC		STP	PEN 19				P	
	P	1438	X	S ROUGH COMB COF		R		OFF	ON	VDC		STP	PEN 78				P	
	P	1544	X	VERNIER CONTROL		R		OFF	ON	VDC		STP	PEN 7				P	
	P	1545	X	S IGN STAGE CONTROL		R		OFF	ON	VDC		STP	PEN 6				P	
	P	1546	X	B2 CUTOFF RELAY		R		OFF	ON	VDC		STP	PEN 12				P	
	P	1547	X	B1 CUTOFF RELAY		R		OFF	ON	VDC		STP	PEN 11				P	
	P	1548	X	COMPLETE COF RELAY		R		OFF	ON	VDC		STP	PEN 17				P	
	P	1549	X	IGNITION START		R		OFF	ON	VDC		STP	PEN 9				P	
	P	1785	X	B SECONDARY SHUTDOWN		R		OFF	ON	VDC		STP					P	
	S			AUTOPILOT SYSTEM														
	S	M358	D	ROLL PROGRAM READOUT		M											P	
	S	1048	V	PROGRAMMER PITCH SIG		D		0	2.7	VAC	.2	SLO					P	
	S	1049	V	PROGRAMMER ROLL SIG		D		0	60	VAC	3	STP					P	
	S	1107	V	B1 PCH ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1108	V	B2 PCH ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1113	V	V1 YAW ACTR FEEDBACK		D		M5	7	VAC	5%	30					P	
	S	1114	V	V2 YAW ACTR FEEDBACK		D		M5	7	VAC	5%	30					P	
	S	1118	V	V2 ROL ACTR FEEDBACK		D		M11	11	VAC	5%	30					P	
	S	1119	V	V1 ROL ACTR FEEDBACK		D		M11	11	VAC	5%	30					P	
	S	1121	V	GYRO TEST SIG		D		M5	5	VAC	.1	STP					P	
	S	1122	V	SERVO TEST SIGNAL		D		M11	11	VAC	5%	30					P	
	S	1128	V	B1 YAW ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1129	V	B2 YAW ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1147	V	PITCH GYRO AMP OUT		D		M10	10	VAC	1	30					P	
	S	1148	V	YAW GYRO AMP OUT		D		M10	10	VAC	1	30					P	
	S	1149	V	ROLL GYRO AMP OUT		D		M10	10	VAC	1	30					P	
	S	1216	V	S PCH ACTR FEEDBACK		D		M10	10	VAC	5%	30					P	
	S	1217	V	S YAW ACTR FEEDBACK		D		M10	10	VAC	5%	30					P	
	S	M270	V	FINE HEATER-PITCH		M		0	150	VAC							P	
	S	M271	V	FINE HEATER-YAW		M		0	150	VAC							P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 32 LANDLINE REPORT NO. AZC-27-059-3 DATE 07 JUL 60 PAGE 7

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
	S	M272	V	FINE HEATER-ROLL		M		0	150	VAC							P	
	S	M176	W	PROGRAM RUN TIME		M		0	999	SEC							P	
	S	M282	W	DECADE EVENT TIMER		M		0	K100	SEC							P	
	S	1235	X	PROGRAMMER RUN TIME		R		OFF	ON	VDC		STP					P	
	T			TELEMETERING SYSTEM														
	T	M140	V	TLM #1 BAT DC		M											P	
	T	M141	V	TLM #1 EXTERNAL DC		M											P	
	T	M144	V	TLM #2 BAT DC		M											P	
	T	M145	V	TLM #2 EXTERNAL DC		M											P	
	T	M146	V	TLM #3 BAT DC		M											P	
	T	M147	V	TLM #3 EXTERNAL DC		M											P	
	T	M156	V	TLM 1-FIL INT DC		M											P	
	T	M157	V	TLM 1-FIL EXT DC		M											P	
	T	M158	V	TLM 2-FIL INT DC		M											P	
	T	M159	V	TLM 2 FIL EXT DC		M											P	
	T	M160	V	TLM 3 FIL INT DC		M											P	
	T	M161	V	TLM 3 FIL EXT DC		M											P	
	T	M161	V	TLM 3 FIL EXT DC		M											P	
	T	M150	W	TLM #1 TOTAL		M		0	1000	HR							P	
	T	M151	W	TLM #2 TOTAL		M		0	1000	HR							P	
	T	M152	W	TLM #3 TOTAL		M		0	1000	HR							P	
	T	M153	W	TLM #1 BAT TIMER		M											P	
	T	M154	W	TLM #2 BAT TIMER		M											P	
	T	M155	W	TLM #1 BATTERY		M		0	60	MIN							P	
	U			PROPELLANT UTILIZ														
	U	1091	V	ERROR RATIO DEMOD OP	S			M20	20	VDC	.5	20					P	

REPORT NO. AZC-27-059-3A

SECTION 10

7 JULY 1960

CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 3E LANDLINE   REPORT NO. AZC-27-059-3   DATE 07 JUL 60   PAGE 8

Vehicle (1)	System (2)	Measurement Number (3)	Type Measurement (4)	Description (5)	Recorder (6)	Track (7)	Channel (8)	Measurement Range Low (9)	Measurement Range High (9)	Units of Function (10)	Accuracy (11)	Rate of Change or Frequency of Function (12)	Type of Transducer (13)	Serial No (14)	Station No. (15)	Quadrant (16)	Card Code (17)	Drawing Numbers
	U	1200	X	LO2 100% SLUG COF-1		R		OFF	ON	VDC		STP					P	
	U	1201	X	LO2 TOPG HI CTL-1		R		OFF	ON	VDC		STP					P	
	U	1202	X	LO2 TOPG LO CTL-1		R		OFF	ON	VDC		STP					P	
	U	1203	X	LO2 95% RAPID LOAD-1		R		OFF	ON	VDC		STP					P	
	U	1204	X	FUEL 100% SEC CTL		R		OFF	ON	VDC		STP					P	
	U	1205	X	FUEL 100% PRI CTL		R		OFF	ON	VDC		STP					P	
	U	1206	X	FUEL 95% SEC CTL		R		OFF	ON	VDC		STP					P	
	U	1207	X	FUEL 95% PRI CTL		R		OFF	ON	VDC		STP					P	
	U	1208	X	LO2 100% SLUG COF-2		R		OFF	ON	VDC		STP					P	
	U	1209	X	LO2 TOPG HI CTL-2		R		OFF	ON	VDC		STP					P	
	U	1210	X	LO2 TOPG LO CTL-2		R		OFF	ON	VDC		STP					P	
	U	1211	X	LO2 95% RAPID LOAD-2		R		OFF	ON	VDC		STP					P	

[redacted]

T... 2..9
20 September 1960

To: All Holders of Report AZC-27-059

From: T. M. Wooster - Test Planning

Subject: Instrumentation Configuration Report, Series E, Addendum 4 (Revision A) dated 16 August 1960

The enclosed revision has been prepared to summarize all the instrumentation changes made since the publication of the original 4-F Report.

It is recommended that this report be physically incorporated in the back of Report AZC-27-059, replacing the superseded pages, in order that holders of the document may have a complete instrumentation configuration document on the E series under a single cover.

The replaced pages are to be destroyed in accordance with existing security regulations.

T. M. Wooster

T. M. Wooster
Instrumentation Planning
578-12

TMW:MSH:org

Distribution List
Report AZC-27-059-4

NOTE: THIS MEMO TO BE UNCLASSIFIED WHEN DETACHED FROM CLASSIFIED DOCUMENT.

[redacted]

[redacted]

CONVAIR ASTRONAUTICS
GENERAL DYNAMICS CORPORATION

TPL: 2280
26 June 1960

To: All Holders of Report AZC-27-059

From: T. M. Wooster - Test Planning

Subject: Instrumentation Configuration Report, Series E, Article 4, dated 3 May 1960

The enclosed report has been prepared to reflect the instrumentation configuration (both landline and telemetry) of missile 4-E.

It is recommended that this report be physically incorporated in the back of Report AZC-27-059, in order that holders of the document may have a complete instrumentation configuration document for the E-R&D series under a single cover.

T. M. Wooster

T. M. Wooster
Instrumentation Planning

TMW:MSB:prg

Distribution List
Report AZC-27-059-4

NOTE: THIS MEMO TO BE DECLASSIFIED WHEN DETACHED FROM CLASSIFIED DOCUMENT.

[redacted]

FORM A 40

[redacted]

REPORT NO. AZC-27-059-4
DATE 3 May 1960
NO. OF PAGES 37

CONVAIR (ASTRONAUTICS) DIVISION
GENERAL DYNAMICS CORPORATION

WS-107A-1

INSTRUMENTATION CONFIGURATION

SERIES E ARTICLE 4

AMR

PREPARED BY TEST PLANNING

COORDINATED BY W. S. Becker
W. S. Becker

APPROVED BY H. R. Macdonald
pm H. R. Macdonald
Test Planning

CHECKED BY T. M. Wooster
T. M. Wooster
Instrumentation

APPROVED BY P. J. Lynch
P. J. Lynch
Chief-Field Test
Engineering

GD

[redacted]

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
A	16 Aug 60	WSB	ADDITIONS:	
			EM109W, EM110W, F1194P, P1083B,	ALL TABS
			P1084B, F1349B, P1528D, P14390,	
			P14520, F14530, P18930, P18940,	
			P1001P, P1002P, P1003P, P1004P,	
			P155P, P184P, P185P, P188P, P1189P,	
			P1190P, P279P, PM430P, P341P, P473P,	
			P1020T, P1151T, P1204T, P1205T,	
			P1437W, P1454W, P1455W, P1897W,	
			P1898W, P1192X, P1193X, P1438X,	
			P1785X, P1975X, P1976X, S1370X,	
			S1371X, S1372X, S1373X, S1374X,	
			S1375X, S1376X, S1377X, S1378X,	
			S1379X, TM156V, TM157V, TM158V,	
			TM159V, TM160V, TM161V, U1208X,	
			U1209X, U1210X, U1211X	
			Reasons for Revision "A" Changes	4-1
A	16 Aug 60	WSB	DELETIONS:	
			P1279P, P1341P, P419P, P420P, P1473P	ALL TABS
			[illegible]	

FOREWORD

This report has been published in accordance with contractual requirements as cited in Convair-Astronautics Report ZM-7-289. It describes the instrumentation released for Missile 4-E as of 16 August 1960. A

Information presented here will be used by Air Force, Associate Contractors, Design, Operation, and Field Test Groups. Measurement modification will either originate in the Instrumentation Planning Group or will be submitted as a recommendation to this group.

TABLE OF CONTENTS

SUMMARY

The instrumentation for this missile has been established to support test objectives, systems analysis, and operating considerations. A discussion of missile instrumentation and associated characteristics has been summarized in Report AZC-27-059. For a detailed description of the various missile systems, test objectives, and general test program see Report AZC-27-043.

The specific measurements to be transmitted via telemeter have been tabulated and are listed in Sections 8 and 9 in terms of instrumentation system and telemeter channel assignments.

In addition to the telemetry, the landline instrumentation program for this missile has been included in this report in the form of a master tabulation of landline measurement characteristics, (Section 10). To clarify specific measurements, instrumentation location schematics have been included in Report AZC-27-059, Section 7.

REASONS FOR REVISION "A" CHANGES

I. In order to gain data on the performance of the MA-3 turbopump lube oil and pressurization systems during flight, 3 lube oil pressure measurements were switched from landline to telemetry.

MEAS NO.	DESCRIPTION	CHANNEL
DELETE:		
P1279P	B2 LO PR LUBE OIL MAN	
P1341P	S LUBE OIL MANIFOLD	
P1473P	B1 LO PR LUBE OIL MAN	
ADD:		
P279P	B2 LO PR LUBE OIL MAN	2.11.43
P341P	S LUBE OIL MANIFOLD	2.11.47
P473P	B1 LO PR LUBE OIL MAN	2.11.45

II. The turbopump speeds, RCC accelerometers and binary counter outputs will be recorded during FRF's to gain data on rough combustion and other thrust chamber and turbopump phenomena. The pump speeds, RCC accelerometers, and RCC counter outputs will be recorded on AM tape. Thrust chamber pressure will be recorded on oscillograph.

ADD:		
P1083B	B2 PUMP SPEED	
P108[illegible]B	B1 PUMP SPEED	
P1349B	S PUMP SPEED	
P1439O	S NAA RCC ACCEL	
P1452O	B1 NAA RCC ACCEL	
P1453O	B2 NAA RCC ACCEL	
P1437W	S RCC BINARY COUNTER	
P1454W	B1 RCC BINARY COUNTER	
P1455W	B2 RCC BINARY COUNTER	
P185P	B1 TURBOPUMP GEAR BOX	2.11.49
P188P	B2 TURBOPUMP GEAR BOX	2.11.51

[redacted]

CONVAIR-ASTRONAUTICS

16 August 1960

III. In order to assure that the orifices have been properly sized in the booster gas generator LO_2 feed lines:

MEAS. NO.	DESCRIPTION	CHANNEL
ADD:		
P1001P	B1 LO_2 PUMP INLET	
P1002P	B1 FUEL PUMP INLET	
P1003P	B2 LO_2 PUMP INLET	
P1004P	B2 FUEL PUMP INLET	
P1020T	B1 LO_2 PUMP INLET	
P155P	B1 GAS GEN COMBUSTOR	1.12.23
P184P	B2 GAS GEN COMBUSTOR	1.12.33
P1151T	FUEL TK @ STA 1043	
DELETE:		
P419P	B1 GG LO_2 INJ MAN	
P420T	B2 GG LO_2 INJ MA	

IV. To allow evaluation of revised LO_2 slug system [illegible] temperature and 2 pressure measurements have been added:

ADD:

P1189P	B1 GAS GEN LO_2 IN
P1190P	B2 GAS GEN LO_2 IN
P1204T	B1 TOPPING LINE OUT
P1205T	B2 TOPPING LINE OUT

V. IBM difficulties make it desirable to assign different measurement numbers for the new CVA dual LO_2 tanking probes.

ADD:

U1208X	LO_2 100% SLUG COF-2
U1209X	LO_2 TOPG HI CTL-2
U1210X	LO_2 TOPG LO CTL-2
U1211X	LO_2 95% RAPID LOAD-2

[redacted]

VI. The following rough combustion control cutoff signals will be monitored to ascertain type and timing of shutdown for failure analysis purposes. Measurement P1785X was added to validate the booster secondary shutdown system timer:

MEAS. NO.	DESCRIPTION
ADD:	
P1192X	B1 ROUGH COMB CUTOFF
P1193X	B2 ROUGH COMB CUTOFF
P1438X	S ROUGH COMB CUTOFF
P1785X	B SECONDARY SHUTDOWN

VII. To detect combustion instability in the MA-3 engines for safety and failure analysis purposes:

ADD:

P1893O	B1 NAA ACCEL BK-U
P1894O	B2 NAA ACCEL BK-U
P1897W	B1 RCC BIN CTR BK-U
P1898W	B2 RCC BIN CTR BK-U
P1975X	B1 RCC BACK-UP RELAY
P1976X	B2 RCC BACK-UP RELAY

VIII. Due to recent difficulties experienced on Missile 54-D's autopilot programmer, a method is needed to show proper programmer operation just prior to launch. These measurements will provide a record for proof of proper sequence operation or data for failure analysis. These measurements will be made during the Integrated Systems Tests of the A/P programmer:

ADD:

S1370X	STAGING
S1371X	BOOSTER JETTISON
S1372X	PRESSURE VERN TANK
S1373X	BOOSTER CUTOFF
S1374X	SUSTAINER CUTOFF

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[redacted]

CONVAIR-ASTRONAUTICS

MEAS. NO.	DESCRIPTION
ADD:	
S1375X	VSHPS BACK-UP SIGNAL
S1376X	VERNIER CUTOFF
S1377X	EJECT RV UMBILICAL
S1378X	RV JETTISON
S1379X	FIRE RETRO ROCKETS

SECTION 8

MISSILE INSTRUMENTATION BY SYSTEM

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by system.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

UNITS OF FUNCTION

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

A	F	1	P	LO_2 TANK HELIUM	1	11	35	0	45	PIA	SLO	7 01723 11		480	2		P	27-11608
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA	SLO	7 01723 13		925	Y		P	27-11609
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA	SLO	7 01731 3		1243	4		P	27-16500
A	F	260	P	B TANK HE BOTTLES LO	1	11	17	15	415	PIA	SLO	7 01727 1		1238	1		P	27-11600
A	F	261	P	S TANK HE BOTTLE LO	1	11	21	15	415	PIA	SLO	7 01727 1		1223	2		P	27-16505

MEASUREMENT NUMBER

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number assignment for the applicable measurement.

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 4-E REPORT NO. AZC-27-059-4 DATE 16 AUG 60 PAGE 1

1 Vehicle	2 System	3 Measurement Number	4 Type Measurement	5 Description	6 Telemeter No	7 Sub-Carrier No.	8 Commutator Pin No	9 Measurement Range Low	9 Measurement Range High	10 Units of Function	11 Accuracy	12 Rate of Change or Frequency of Function	13 Type of Transducer	14 Serial No.	15 Station No.	16 Quadrant	17 Card Code	Drawing Numbers
	A			AIRFRAME														
	A	285	I	THRUST SECT LITE B1	3	11	1	0	600	FTC			7 01709 1		1220	A	P	27-11733
	A	744	I	THRUST SECT LITE B2	3	11	3	0	600	FTC			7 01709 1		1220	2	P	27-11733
	A	483	T	AMB F STG VLV Q3	1	11	15	M100	300	DGF		SLO	27 01287 3	1435T			P	27-11793
	A	636	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3	1430T			P	27-11793
	A	639	T	AMB JET RAIL Q4	1	11	45	M100	300	DGF		SLO	27 01287 3	1433T			P	27-11793
	A	640	T	FWD SIDE A FRAME Q4	1	11	31	M100	300	DGF		SLO	27 01287 3	1279T			P	27-11793
	A	641	T	AMB F STG VLV Q1	1	11	37	M100	300	DGF		SLO	27 01287 3	1273T			P	27-11793
	A	642	T	AMB NEAR B2 GG Q2	1	11	43	M100	300	DGF		SLO	27 01287 3	1265T			P	27-11794
	A	645	T	AMB FWD B1 Q4	1	11	33	M100	300	DGF		SLO	27 01287 3	1316T			P	27-11794
	D			RANGE SAFETY SYSTEM														
	D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC		STP					P	
	D	1	V	RSC CUTOFF OUTPUT	1	6	3	0	31	VDC		BLP					M	
	D	7	V	A1 RSC RF INPUT/AGC	1	A	5	15	100K	UV		SLO		128			P	
	D	3	X	RSC DESTRUCT OUTPUT	2	1	95	0	30	VDC		STP					P	
	E			ELECTRICAL POWER SYS														
	E	50	G	400 CYCLE AC PWRSUP	1	1		370	430	CPS		SLO		2			P	
	E	23	V	RSC SYSTEM [illegible] INPUT	1	13	11	0	30	VDC		SLO		2			P	
	E	21	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC		SLO		2			P	
	E	[illegible]	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC		SLO		2			P	
	F			PNEUMATIC SYSTEM														
	F	1	P	LO2 TANK HELIUM	1	13	33	0	45	PIA		SLO	7 01723 11	3166	48A	3	P	27-11679
	F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA		SLO	7 01723 13	V3880	948	3	P	27-11683

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 4-E REPORT NO. AZC-27-059-4 DATE 16 AUG 60 PAGE 2

1 VEHICLE	2 SYSTEM	3 MEASUREMENT NUMBER	4 TYPE MEASUREMENT	5 DESCRIPTION	6 TELEMETER NO	7 SUB-CARRIER NO	8 COMMUTATOR PIN NO.	9 MEASUREMENT RANGE LOW	9 MEASUREMENT RANGE HIGH	10 UNITS OF FUNCTION	11 ACCURACY	12 RATE OF CHANGE OR FREQUENCY OF FUNCTION	13 TYPE OF TRANSDUCER	14 SERIAL NO.	15 STATION NO.	16 QUADRANT	17 CARD CODE	DRAWING NUMBERS
	F	65	P	LO2 TK HE LIN @ ORFC	1	A	51	0	45	PIA		SLO	27 01243 5	1799E	1127	4	P	27-11732
	F	114	P	LO2 PRESS REG INLET	1	13	45	0	3000	PIA		SLO	7 01731 9	5671	1187	4	P	27-11682
	F	145	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA		SLO	7 01720 5	5081	1213	2	P	27-11650
	F	147	P	LO2 PRESS ORFC DP	1	A	49	0	5	PID		SLO	27 01280 1	313D	1127	3	P	27-11732
	F	246	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA		SLO	7 01720 5	4337	1187	4	P	27-11682
	F	260	P	B TK HE BOTTLES LO	1	12	31	0	400	PIA		SLO	7 01727 1	4984	1187	4	P	27-11682
	F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01684 3	R151	1205	4	P	27-11682
	F	146	T	LO2 PRESS ORFC IN	1	11	11	0	500	DGF		SLO	7 01684 3	145R	1121	3	P	27-11732
	F	247	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01633 5	22L	1221	4	P	27-11682
	F	290	T	S CTL HE BOTTLE	1	11	41	M100	100	DGF		SLO	7 01633 7	18L	1235	2	P	27-11650
	G			RADIO GUIDANCE SYS														
	G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA		SLO					P	
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E		SLO					P	
	G	503	V	MOD III PB AGC	1	11	17	0	M4.8	VDC		SLO					P	
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
	H			HYDRAULIC SYSTEM														
	H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA		SLO	7 01731 9	5310	1173	1	P	27-11721
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA		SLO	7 01720 5	5175	1213	2	P	27-11650
	I			INERTIAL GUIDANCE														
	I	513	A	ACCEL XF1 DIRECT	3	C				G							P	
	I	514	A	ACCEL XF2 DIRECT	3	E				G							P	
	I	516	A	ACCELEROMETER YF1	2	A				G							P	
	I	5		ACCELEROMETER ZF1	3	13				G							P	
	I	519	A	ACCELEROMETER YF2	2	C				G							P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
3	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	72	
	I	520	A	ACCELEROMETER ZF2	3	A				G							P	
	I	549	D	PITCH SERVO ERROR	2	6		M4.1	4.1	MIN		20					P	
	I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20					M	
	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	DEG		100					P	
	I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
	I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100					M	
	I	552	D	REDNOT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35					P	
	I	552	D	REDNOT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
	I	505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	
	I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
	I	560	O	BINNACLE X AXIS	1	C	1	M10	10	G		800					P	
	I	561	O	BINNACLE Y AXIS	1	C	9	M10	10	G		800					P	
	I	562	O	BINNACLE Z AXIS	1	C	17	M10	10	G		800					P	
	I	564	O	COMPUTER X AXIS	1	C	25	M10	10	G		800					P	
	I	565	O	COMPUTER Y AXIS	1	C	33	M10	10	G		800					P	
	I	566	O	COMPUTER Z AXIS	1	C	41	M10	10	G		800					P	
	I	574	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
	I	531	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	
	I	532	T	GYRO 2	1	12	3	M6.3	6.3	DGC		SLO					P	
	I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No.	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Calib Code	Drawing Numbers
	I	534	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
	I	535	T	COMPUTER	1	12	19	0	50	DGC		SLO					P	
	I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	
	I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10					M	
	I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
	I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6					M	
	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
	I	540	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		SLO					P	
	I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
	I	543	V	COMPUTER M50 PSUP	3	9		M55	0	VDC		SLO					P	
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
	I	545	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
	I	547	V	COMPUTER 4 PSUP	1	13	43	0	6	VDC		SLO					P	
	I	548	V	COMPUTER 38 PSUP	1	12	41	0	42	VDC		SLO					P	
	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	
	I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
	I	510	W	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
	I	581	W	TIME T	2	8	S					BLP					P	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	521	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP					P	
	I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	522	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP					P	
	I	523	X	S&V COF RELAYS	2	10	S	OFF	ON			BLP					P	
	I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
	I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
	I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
	I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	M			MISCELLANEOUS														

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No.	Quadrant	Card Code	Drawing Numbers
	M	143	D	BOOSTER SEPARATION	3	7		0	6	IF		14	7 01676 1	VT12	1131	1	P	27-11723
	M	32	A	CONAX VALVE COMMAND	1	A	23	OFF	ON			STP					P	
		76	X	STROBE LIGHT OCCUR	1	C	35			VDC		STP					P	
		84	X	B STGG LATCH MSW G1	3	8		OFF	ON				87 44900 109			1	P	27-11797
	M	85	X	B STGG LATCH MSW G2	3	8		OFF	ON				87 44900 109			2	P	27-11797
	M	86	X	B STGG LATCH MSW G3	3	8		OFF	ON				87 44900 109			3	P	27-11797
	M	87	X	B STGG LATCH MSW G4	3	8		OFF	ON				87 44900 109			4	P	27-11797
	P			PROPULSION SYSTEM														
	P	798	A	LO2 LINE AXIAL ACCEL	2	12		M60	60	G		100	27 01277 5	404			P	27-11787
	P	799	A	LO2 LINE LAT ACCEL	2	13		M60	60	G		100	27 01277 5	361			P	27-11787
	P	83	B	B2 PUMP SPEED	1	2		5680	6400	RPM		SLO	27 01267 11	23	1198	2	P	27-11722
	P	84	B	B1 PUMP SPEED	2	2		5680	6400	RPM		SLO	27 01267 1	15	1198	4	P	27-11721
	P	349	D	S PUMP SPEED	1	3		9.9	11.2	KPM		SLO	27 01264 3	21N	1234	3	P	27-11720
	P	928	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG		SLO	NAA				P	
	P	929	D	S MAIN LO2 VLV	1	12	37	0	90	DEG		SLO	NAA		1205	X	P	27-17564
	P	6	P	S THRUST CHAMBER	2	C	1	0	1000	PIA		150	7 01731 5	6569	1235	X	P	27-11720
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA		SLO	7 01720 3	4332	1208	Y	P	27-11651
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA		SLO	7 01737 5	1167	1127	4	P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA		SLO	7 01737 3	1044	1127	2	P	27-11699
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA		SLO	7 01720 3	2643	1208	Y	P	27-11651
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA		15	7 01731 5	5436	1144	3	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	PIA		15	7 01731 5	2687	1173	1	P	27-11721
	P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA		SLO	27 01243 9	0037F	1235	X	P	27-11720
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA		15	7 01731 1	6276	1244	Y	P	27-11684
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA		15	7 01731 1	6296	1244	Y	P	27-11684
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA		SLO	7 01731 5	6029	1244	Y	P	27-11684
	P	92	P	B2 LO2 INJ MANIFOLD	1	12	15	0	1000	PIA		SLO	7 01731 5	5103	1244	Y	P	27-11684

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
	P	155	P	B1 GAS GEN COMBUSTOR	1	12	23	0	1000	PIA		SLO	7 01731 5	5392	1173	1	P	
	P	184	P	B2 GAS GEN COMBUSTOR	1	12	33	0	1000	PIA		SLO	7 01731 5	5566	1144	3	P	27-11720
	P	185	P	B1 TURBOPUMP GEARBOX	2	11	49	0	15	PIG		SLO	27 01243 5				P	
	P	188	P	B2 TURBOPUMP GEARBOX	2	11	51	0	15	PIG		SLO	27 01243 5				P	
	P	279	P	B2 LO PR LUB OIL MAN	2	11	43	0	125	PIA		SLO					P	
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA		15	7 01731 7	5759	1235	X	P	27-11720
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA		SLO	7 01731 5	6609	1235	X	P	27-11720
	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA		SLO					P	
	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA		SLO	7 01731 5	6232	1235	X	P	27-11721
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIG		SLO					P	
	P	474	P	V CTL PRESS REG OUT	1	A	15	0	1000	PIA		SLO	7 01720 1	2880	1208	Y	P	27-11651
	P	5[illegible]0	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	R49	1197	X	P	27-11720
	P	671	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	27 01287 3	1286T			P	
	P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 01247 3	33L	1234	3	P	27-11720
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247 3	52	1210	1	P	27-11721
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247 3	57	1210	3	P	27-11722
	P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	P	547	X	B1 CUTOFF RELAY	1	7	5	0	28	VDC		STP					P	
	P	548	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP					P	
	S			AUTOPILOT SYSTEM														
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG		5		16			P	
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG		5		16			P	
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG		5		16			P	
	S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG		10	7 01680 7	1203	1212	Y	P	
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG		30	7 01680 7	1203	1212	Y	M	27-11721
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG		10	7 01680 7	719	1212	Y	P	27-11722
	S	205	D	B1 YAW	1	6		M5	5	DEG		10	7 01680 7	1218	1212	4	P	
	S	205	D	B1 YAW	2	11	5	M5	5	DEG		30	7 01680 7	1218	1212	4	[illegible]	27-11721
	S	206	D	B2 YAW	2	E	19	M5	5	DEG		10	7 01680 7	876	1212	2	P	27-11722

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Subcarrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
	S	222	D	V1 PITCH	2	E	7	0	50	DEG		10	7 01414 1	07664	1123	4	P	27-11699
	S	223	D	V2 PITCH	2	E	5	0	50	DEG		10	7 01414 1	98327	1123	2	P	27-11699
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG		10	27 01205 1	230H	1124	4	P	27-11699
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG		10	27 01205 1	90	1129	2	P	27-11699
	S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG		6	7 01680 9	937	1210	Y	P	
	S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG		30	7 01680 9	939	1210	Y	M	27-11720
	S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG		6	7 01680 3	604	1210	X	P	
	S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG		30	7 01680 3	604	1210	X	M	27-11720
	S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S		15		16			P	
	S	52	R	ROLL RATE GYRO	2	11	12	M8	8	D/S		15		16			M	
	S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S		15		16			P	
	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S		15		16			M	
	S	54	R	YAW RATE GYRO SIG	1	8		M6	6	D/S		15		16			P	
	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S		15		16			M	
	S	248	X	RELEASE PAYLOAD	1	13	3	OFF	ON	VDC		STP					P	
	T	2	T	81 T/C REFER JUNCT	1	11	19	0	200	DGF		SLO	27 01287 1	2145T	1173	1	P	27-11721
	T	5	T	S T/C REFER JUNCT	1	11	23	0	200	DGF		SLO	27 01287 1	2150T	1235	X	P	27-11720
	U			PROPELLANT UTILIZ														
	U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID		SLO	27 01280 1	272D	948	3	P	27-11683
	U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01280 1	273D	948	3	P	27-11683
	U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC		SLO		2			P	
	Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
	Z			AZUSA														
	Z	2	E	KLYSTRON PWR OUTPUT	1	11	1					SLO					P	

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MISSILE INSTRUMENTATION LOG SHEET

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1 VEHICLE	2 SYSTEM	3 MEASUREMENT NUMBER	4 TYPE MEASUREMENT	5 DESCRIPTION	6 TELEMETER NO	7 SUBCARRIER NO	8 COMMUTATOR PIN NO	9 MEASUREMENT RANGE LOW	9 MEASUREMENT RANGE HIGH	10 UNITS OF FUNCTION	11 ACCURACY	12 RATE OF CHANGE OR FREQUENCY OF FUNCTION	13 TYPE OF TRANSDUCER	14 SERIAL NO	15 STATION NO.	16 QUADRANT	17 CARD CODE	DRAWING NUMBERS
3	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	72	
	2	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM		3		35			P	

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SECTION 9

MISSILE INSTRUMENTATION BY CHANNEL

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by channel.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function.

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

UNITS OF FUNCTION

A	P	29	P	V2 THRUST CHAMBER	1	11	5	0	400	PIA		SLO	7 01737 1		1128	2		P	27-11614
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA		SLO	7 01731 3		1243	4		P	27-16500
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA		SLO	7 01723 13		925	Y		P	27-11609
A	P	671	T	TH SECT AMB QUAD 4	1	11	11	100	700	DGF		SLO	7 01694 9		1230	4		P	27-11599

MEASUREMENT NUMBER

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number for the applicable measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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MISSILE [illegible] REPORT NO AZC-27-059-4 DATE 16 AUG 60 PAGE 1

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No.	Quadrant	Card Code	Drawing Numbers
[illegible]	[illegible]	[illegible]	[illegible]	COMM. [illegible]	1	2												
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	1		270	430	CPS		BLO		2			P	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	2		[illegible]	[illegible]	[illegible]		BLO	27 01267 11	23	1198	2	P	27-11722
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	3		[illegible]	[illegible]	RPM		BLO	27 01264 3	21N	1234	3	P	27-11720
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	4		M3.0	3.0	DEG		6	7 01680 9	937	1210	Y	P	27-11720
[illegible]	[illegible]	[illegible]	[illegible]	[illegible] PITCH	1	5		M3.0	3.0	DEG		6	7 01680 3	604	1210	X	P	27-11720
[illegible]	[illegible]	[illegible]	[illegible]	[illegible] YAW	1	6		M5	5	DEG		10	7 01680 7	1218	1212	4	P	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible] CUTOFF OUTPUT	1	6	3	0	31	VDC		BLP					M	27-11721
[illegible]	[illegible]	[illegible]	[illegible]	[illegible] PITCH ROLL	1	7		M5	5	DEG		10	7 01680 7	1203	1212	Y	P	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible] CUTOFF RELAY	1	7	3	0	28	VDC		STP					P	27-11721
[illegible]	[illegible]	[illegible]	[illegible]	YAW RATE GYRO SIG	1	8		M6	6	D/S		15		16			P	
[illegible]	[illegible]	[illegible]	[illegible]	PITCH RATE GYRO SIG	1	9		M6	6	D/S		15		16			P	
[illegible]	[illegible]	[illegible]	[illegible]	ROLL RATE GYRO	1	10		M8	8	D/S		15		16			P	

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MISSILE INSTRUMENTATION LOG SHEET

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
				COMM. RATE 2.5 RPS	1	11	0											
	Z	2	E	KLYSTRON PWR OUTPUT	1	11	1					SLO					P	
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E		SLO					P	
	F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01684 3	R151	1205	4	P	27-11682
	G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA		SLO					P	
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	49	1197	X	P	27-11720
	F	146	T	LO2 PRESS ORFC IN	1	11	11	0	500	DGF		SLO	7 01684 3	145R	1121	3	P	27-11732
	A	638	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3	1430T			P	27-11793
	A	488	T	AMB F STG VLV Q3	1	11	15	M100	300	DGF		SLO	27 01287 3	1435T			P	27-11793
	G	503	V	MOD III PB AGC	1	11	17	0	M4.8	VDC		SLO					P	
	T	2	T	B1 T/C REFER JUNCT	1	11	19	0	200	DGF		SLO	27 01287 1	2145T	1173	1	P	27-11721
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
	T	3	T	S T/C REFER JUNCT	1	11	23	0	200	DGF		SLO	27 01287 1	2150T	1235	X	P	27-11720
				100% CALIB	1	11	25											
				0% CALIB	1	11	27											
				0% CALIB	1	11	29											
	A	640	T	FWD SIDE A FRAME Q4	1	11	31	M100	300	DGF		SLO	27 01287 3	1279T			P	27-11793
	A	645	T	AMB FWD B1 Q4	1	11	33	M100	300	DGF		SLO	27 01257 3	1316T			P	27-11794
	F	247	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01633 5	22L	1221	4	P	27-11682
	A	641	T	AMB F STG VLV Q1	1	11	37	M100	300	DGF		SLO	27 01287 3	1273T			P	27-11793
	P	671	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	27 01287 3	1286T			P	
	F	290	T	S CTL HE BOTTLE	1	11	41	M100	100	DGF		SLO	7 01633 7	18L	[illegible]	2	P	27-11650
	A	642	T	AMB NEAR B2 GG Q1	1	11	43	M100	300	DGF		SLO	27 01287 3	1265T			P	27-11794
	A	639	T	AMB JET RAIL Q4	1	11	45	M100	300	DGF		SLO	27 01287 3	1433T			P	27-11795
	G	503	V	CONNECTED TO 1 11 17	1	11	47											
					1	11	49											
	G	579	V	CONNECTED TO 1 11 21	1	11	51											
					1	11	53											
				SYNC & 100% CALIB	1	11	55											
				CONNECTED TO 1 11 55	1	11	56											
				CONNECTED TO 1 11 56	1	11	57											
				CONNECTED TO 1 11 57	1	11	58											
				CONNECTED TO 1 11 58	1	11	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR P/N NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 5 RPS	1	12	0											
	I	531	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	
	I	532	T	GYRO 2	1	12	3	M6.3	6.3	DGC		SLO					P	
	I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
					1	12	7											
					1	12	9											
	I	545	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		SLO					P	
	I	534	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
	I	572	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
	F	145	P	B CTL HE BTL DISCH	1	12	17	0	3500	PIA		SLO	7 01720 5	5081	1213	2	P	27-11650
	I	[illegible]	T	COMPUTER	1	12	19	0	50	DGC		SLO					P	
	I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
	P	155	P	C1 GAS GEN COMBUSTOR	1	12	23	0	1000	PIA		SLO	7 01731 5	5392	1173	1	P	
				100% CALIB	1	12	25											
				0% CALIB	1	12	27											
				50% CALIB	1	12	29											
	F	200	P	B TK HE BOTTLES LO	1	12	31	0	400	PIA		SLO	7 01727 1	4964	1187	4	P	27-11682
	P	184	P	C2 GAS GEN COMBUSTOR	1	12	33	0	1000	PIA		SLO	7 01731 5	5566	1144	3	P	27-11720
	I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
	P	529	D	B MAIN LO2 VLV	1	12	37	0	90	DEG		SLO	NAA		1205	X	P	27-17564
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
	I	545	V	COMPUTER 36 PSUP	1	12	41	0	42	VDC		SLO					P	
	H	51	P	H1 HYD ACCUMULATOR	1	12	43	0	3500	PIA		SLO	7 01731 9	5310	1173	1	P	27-11721
	I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
	I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	573	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA		SLO	7 01720 5	5175	1213	2	P	27-11650
	F	246	P	B TANK HE BOTTLE HI	1	12	53	0	3500	PIA		SLO	7 01720 5	4337	1187	4	P	27-11682
				SYNC & 100% CALIB	1	12	55											
				CONNECTED TO 1 12 55	1	12	56											
				CONNECTED TO 1 12 56	1	12	57											

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				CONNECTED TO 1 12 57	1	12	58											
				CONNECTED TO 1 12 58	1	12	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CALIB CODE	DRAWING NUMBERS
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
3	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	73	
				COMM. RATE 5 RPS	1	13	C											
					1	13	1											
	S	248	X	RELEASE PAYLOAD	1	13	3	OFF	ON	VDC		STP					P	
	P	548	X	COMPLETE CJF RELAY	1	13	5	0	28	VDC		STP					P	
	D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC		STP					P	
	P	547	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	E	28	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC		SLO		2			P	
	P	30	P	VERNIER LO2 TANK	1	13	13	C	1000	PIA		SLO	7 01720 3	2643	1208	Y	P	27-11651
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA		SLO	7 01731 5	5103	1244	Y	P	27-11684
	P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA		SLO	27 01243 9	0037F	1235	X	P	27-11720
					1	13	19											
	U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01280 1	2730	948	3	P	27-11683
	E	53	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC		SLO		2			P	
				100% CALIB	1	13	25											
				0% CALIB	1	13	27											
				50% CALIB	1	13	29											
	U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID		SLO	27 01280 1	2720	948	3	P	27-11683
	F	1	P	LO2 TANK HELIUM	1	13	33	0	45	PIA		SLO	7 01723 11	3164	484	3	P	27-11679
					1	13	35											
	F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA		SLO	7 01723 13	V3880	948	3	P	27-11683
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA		SLO	7 01731 5	6029	1244	Y	P	27-11684
	I	545	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
	I	547	V	COMPUTER 4 PSUP	1	13	43	0	6	VDC		SLO					P	
	F	114	P	LO2 PRESS REG INLET	1	13	45	0	3000	PIA		SLO	7 01731 9	5671	1187	4	P	27-11682
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA		SLO	7 01720 3	4332	1208	Y	P	27-11651
	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA		SLO	7 01731 5	6232	1235	X	P	27-11721
					1	13	51											
	E	53	V	CONNECTED TO 1 13 23	1	13	53											
				SYNC & 100% CALIB	1	13	55											
				CONNECTED TO 1 13 55	1	13	56											
				CONNECTED TO 1 13 56	1	13	57											
				CONNECTED TO 1 13 57	1	13	58											
				CONNECTED TO 1 13 58	1	13	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 10 RPS	1	A	0											
	E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC		SLO		2			P	
					1	A	3											
	D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	100K	UV		SLO		128			P	
	U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC		SLO		2			P	
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG		5		16			P	
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG		5		16			P	
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG		5		16			P	
	P	474	P	V CTL PRESS REG OUT	1	A	15	0	1000	PIA		SLO	7 01720 1	2880	1208	Y	P	27-11651
	Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM		3		35			P	
	Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
					1	A	21											
	M	32	X	CONAX VALVE COMMAND	1	A	23	OFF	ON			STP					P	
				100% CALIB	1	A	25											
				0% CALIB	1	A	27											
				50% CALIB	1	A	29											
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA		SLO	7 01731 5	6609	1235	X	P	27-11720
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA		SLO	7 01737 5	1167	1127	4	P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA		SLO	7 01737 3	1044	1127	2	P	27-11699
	U	91	V	CONNECTED TO 1 A 7	1	A	37											
	S	61	D	CONNECTED TO 1 A 9	1	A	39											
	S	62	D	CONNECTED TO 1 A 11	1	A	41											
	S	63	D	CONNECTED TO 1 A 13	1	A	43											
	P	528	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG		SLO	NAA				P	
	Z	3	E	CONNECTED TO 1 A 17	1	A	47											
	F	147	P	LO2 PRESS ORFC DP	1	A	49	0	5	PID		SLO	27 01280 1	3130	1127	3	P	27-11732
	F	65	P	LO2 TK HE LIN @ ORFC	1	A	51	0	45	PIA		SLO	27 01243 5	1799F	1127	4	P	27-11732
	M	32	X	CONNECTED TO 1 A 23	1	A	53											
				SYNC & 100% CALIB	1	A	55											
				CONNECTED TO 1 A 55	1	A	56											
				CONNECTED TO 1 A 56	1	A	57											
				CONNECTED TO 1 A 57	1	A	58											
				CONNECTED TO 1 A 58	1	A	59											

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CONVAIR-ASTRONAUTICS

REPORT NO. AZC-27-059-4

SECTION 9

16 AUGUST 1960

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 4-E REPORT NO AZC-27-059-4 DATE 16 AUG 60 PAGE 7

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 1/8 RPS	1	C	0											
	I	560	0	BINNACLE X AXIS	1	C	1	M10	10	G		800					P	
	I	560	0	CONNECTED TO 1 C 1	1	C	2											
	I	560	0	CONNECTED TO 1 C 2	1	C	3											
	I	560	0	CONNECTED TO 1 C 3	1	C	4											
	I	560	0	CONNECTED TO 1 C 4	1	C	5											
	I	560	0	CONNECTED TO 1 C 5	1	C	6											
	I	560	0	CONNECTED TO 1 C 6	1	C	7											
	I	561	0	BINNACLE Y AXIS	1	C	9	M10	10	G		800					P	
	I	561	0	CONNECTED TO 1 C 9	1	C	10											
	I	561	0	CONNECTED TO 1 C 10	1	C	11											
	I	561	0	CONNECTED TO 1 C 11	1	C	12											
	I	561	0	CONNECTED TO 1 C 12	1	C	13											
	I	561	0	CONNECTED TO 1 C 13	1	C	14											
	I	561	0	CONNECTED TO 1 C 14	1	C	15											
	I	562	0	BINNACLE Z AXIS	1	C	17	M10	10	G		800					P	
	I	562	0	CONNECTED TO 1 C 17	1	C	18											
	I	562	0	CONNECTED TO 1 C 18	1	C	19											
	I	562	0	CONNECTED TO 1 C 19	1	C	20											
	I	562	0	CONNECTED TO 1 C 20	1	C	21											
	I	562	0	CONNECTED TO 1 C 21	1	C	22											
	I	562	0	CONNECTED TO 1 C 22	1	C	23											
	I	564	0	COMPUTER X AXIS	1	C	25	M10	10	G		800					P	
	I	564	0	CONNECTED TO 1 C 25	1	C	27											
	I	564	0	CONNECTED TO 1 C 27	1	C	29											
	I	564	0	CONNECTED TO 1 C 29	1	C	31											
	I	565	0	COMPUTER Y AXIS	1	C	33	M10	10	G		800					P	
	I	565	0	CONNECTED TO 1 C 33	1	C	35											
	I	565	0	CONNECTED TO 1 C 35	1	C	37											
	I	565	0	CONNECTED TO 1 C 37	1	C	39											
	I	566	0	COMPUTER Z AXIS	1	C	41	M10	10	G		800					P	
	I	566	0	CONNECTED TO 1 C 41	1	C	43											
	I	566	0	CONNECTED TO 1 C 43	1	C	45											

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 4-E REPORT NO. AZC-27-059-4 DATE 16 AUG 60 PAGE 8

1 VEHICLE	2 SYSTEM	3 MEASUREMENT NUMBER	4 TYPE MEASUREMENT	5 DESCRIPTION	6 TELEMETER NO.	7 SUB-CARRIER NO.	8 COMMUTATOR PIN NO.	9 MEASUREMENT RANGE LOW	9 MEASUREMENT RANGE HIGH	10 UNITS OF FUNCTION	11 ACCURACY	12 RATE OF CHANGE OR FREQUENCY OF FUNCTION	13 TYPE OF TRANSDUCER	14 SERIAL NO.	15 STATION NO.	16 QUADRANT	17 CARD CODE	DRAWING NUMBERS
	1	566	0	CONNECTED TO 1 C 45	1	C	47											
				0% CALIB	1	C	49											
				50% CALIB	1	C	51											
				100% CALIB	1	C	53											
				SYNC & 100% CALIB	1	C	55											
				CONNECTED TO 1 C 55	1	C	56											
				CONNECTED TO 1 C 56	1	C	57											
				CONNECTED TO 1 C 57	1	C	58											
				CONNECTED TO 1 C 58	1	C	59											
	M	78	X	STROBE LIGHT OCCUR	1	C	95			VDC		STP					D	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 4-E   REPORT NO. AZC-27-059-4   DATE 16 AUG 60   PAGE 9

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
				DIGITAL CHANNEL	1	E	G											
	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
	I	510	W	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
	I	505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
	I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 4-E REPORT NO AZC-27-059-4 DATE 16 AUG 60 PAGE 10

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE CONT.	2	0	0											
					2	1												
	P	84	B	B1 PUMP SPEED	2	2		5680	6400	RPM		SLO	27 01267 1	15	1198	4	P	27-11721
	I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
	I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	
	I	549	D	PITCH SERVO ERROR	2	6		M4.1	4.1	MIN		20					P	
	I	521	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP					P	
	I	552	D	REDNDT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35					P	
	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	
	I	581	W	TIME T	2	8	S					BLP					P	
	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	DEG		100					P	
	I	522	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP					P	
	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
	I	523	X	S&V COF RELAYS	2	10	S	OFF	ON			BLP					P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 4-E REPORT NO AZC-27-059-4 DATE 16 AUG 60 PAGE 11

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
3	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	47 51	52 53 54 55 56 57 58 59 60 61	60 64	67 70	71	71	
				COMM. RATE 2.5 RPS	2	11	0											
	S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG		30	7 01680 9	939	1210	Y	M	
	S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG		30	7 01680 3	604	1210	X	M	
	S	205	D	B1 YAW	2	11	5	M5	5	DEG		30	7 01680 7	1218	1212	4	M	
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG		30	7 01680 7	1203	1212	Y	M	
	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S		15		16			M	
	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S		15		16			M	
	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S		15		16			M	
	I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6					M	
	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
	I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10					M	
	I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20					M	
	I	552	D	REDNDT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
				100% CALIB	2	11	25											
				0% CALIB	2	11	27											
				50% CALIB	2	11	29											
	I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
	I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
	I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100					M	
					2	11	37											
					2	11	39											
					2	11	41											
	P	279	P	B2 LO PR LUB OIL MAN	2	11	43	0	125	PIA		SLO					P	
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIG		SLO					P	
	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA		SLO					P	
	P	185	P	B1 TURBOPUMP GEARBOX	2	11	49	0	15	PIG		SLO	27 01243 5				P	
	P	188	P	B2 TURBOPUMP GEARBOX	2	11	51	0	15	PIG		SLO	27 01243 5				P	
					2	11	53											
				SYNC & 100% CALIB	2	11	55											
				CONNECTED TO 2 11 55	2	11	56											
				CONNECTED TO 2 11 56	2	11	57											
				CONNECTED TO 2 11 57	2	11	58											
				CONNECTED TO 2 11 58	2	11	59											

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 4-E REPORT NO AZC-27-059-4 DATE 16 AUG 60 PAGE 12

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE CONT.	2	12	0											
	P	798	A	LO2 LINE AXIAL ACCEL	2	12		M60	60	G		100	27 01277 5	406			P	27-11787
	P	799	A	LO2 LINE LAT ACCEL	2	13		M60	60	G		100	27 01277 5	361			P	27-11787
	I	516	A	ACCELEROMETER YF1	2	A				G							P	
	I	519	A	ACCELEROMETER YF2	2	C				G							P	

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 4-E REPORT NO AZC-27-0 9-4 DATE 16 AUG 60 PAGE 13

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 30 RPS	2	E	0											
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA		150	7 01731 5	6569	1235	X	P	27-11720
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA		15	7 01731 7	5759	1235	X	P	27-11720
	S	223	D	V2 PITCH	2	E	5	0	50	DEG		10	7 01414 1	98329	1123	2	P	27-11699
	S	222	D	V1 PITCH	2	E	7	0	50	DEG		10	7 01414 1	07664	1123	4	P	27-11699
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA		15	7 01731 1	6296	1244	Y	P	27-11684
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA		15	7 01731 1	6274	1244	Y	P	27-11684
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG		10	27 01205 1	230H	1124	4	P	27-11699
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG		10	7 01680 7	715	1212	Y	P	27-11722
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG		10	27 01205 1	90	1129	2	P	27-11699
	S	206	D	B2 YAW	2	E	19	M5	5	DEG		10	7 01680 7	876	1212	2	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	PIA		15	7 01731 5	5687	1173	1	P	27-11721
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA		15	7 01731 5	5436	1144	3	P	27-11722
				100% CALIB	2	E	25											
				0% CALIB	2	E	27											
				50% CALIB	2	E	29											
	P	6	P	CONNECTED TO 2 E 1	2	E	31											
	P	330	P	CONNECTED TO 2 E 3	2	E	33											
	S	223	D	CONNECTED TO 2 E 5	2	E	35											
	S	222	D	CONNECTED TO 2 E 7	2	E	37											
	P	60	P	CONNECTED TO 2 E 9	2	E	39											
	P	59	P	CONNECTED TO 2 E 11	2	E	41											
	S	233	D	CONNECTED TO 2 E 13	2	E	43											
	S	204	D	CONNECTED TO 2 E 15	2	E	45											
	S	234	D	CONNECTED TO 2 E 17	2	E	47											
	S	206	D	CONNECTED TO 2 E 19	2	E	49											
	P	39	P	CONNECTED TO 2 E 21	2	E	51											
	P	38	P	CONNECTED TO 2 E 23	2	E	53											
				SYNC & 100% CALIB	2	E	55											
				CONNECTED TO 2 E 55	2	E	56											
				CONNECTED TO 2 E 56	2	E	57											
				CONNECTED TO 2 E 57	2	E	58											
				CONNECTED TO 2 E 58	2	E	59											
	D	3	X	RSC DESTRUCT OUTPUT	2	E	95	0	30	VDC		STP					P	

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CONVAIR ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

DATE 14 AUG 60 PAGE 14

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE CONT.	3	0	0											
	M	143	D	BOOSTER SEPARATION	3	7		0	8	IN		14	7 01676 1	VT12	1131	1	P	27-11723
	M	84	X	B STGG LATCH MSW Q1	3	8		OFF	ON				87 44900 109			1	P	27-11797
	M	85	X	B STGG LATCH MSW Q2	3	8		OFF	ON				87 44900 109			2	P	27-11797
	M	86	X	B STGG LATCH MSW Q3	3	8		OFF	ON				87 44900 109			3	P	27-11797
	M	87	X	B STGG LATCH MSW Q4	3	8		OFF	ON				87 44900 109			4	P	27-11797
	I	543	V	COMPUTER M50 PSUP	3	9		M55	0	VDC		SLO					P	

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SECTION

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MISSILE INSTRUMENTATION LOG SHEET

DATE 16 AUG 60 PAGE 13

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 2.5 RPS	3	11	0											
	A	295	I	THRUST VECT LITE B1	3	11	1	0	600	FTC			7 01709 1		1220	4	P	27-11733
	A	744	I	THRUST VECT LITE B2	3	11	3	0	600	FTC			7 01709 1		1220	2	P	27-11733
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247 3	52	1210	1	P	27-11721
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247 3	57	1210	3	P	27-11722
	P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 01247 3	33L	1234	3	P	27-11720
					3	11	11											
					3	11	13											
					3	11	15											
					3	11	17											
					3	11	19											
					3	11	21											
					3	11	23											
				100% CALIB	3	11	25											
				0% CALIB	3	11	27											
				0% CALIB	3	11	29											
					3	11	31											
					3	11	33											
					3	11	35											
					3	11	37											
					3	11	39											
					3	11	41											
					3	11	43											
					3	11	45											
					3	11	47											
					3	11	49											
					3	11	51											
					3	11	53											
				SYC & 100% CALIB	3	11	55											
				CONNECTED TO 3 11 55	3	11	56											
				CONNECTED TO 3 11 56	3	11	57											
				CONNECTED TO 3 11 57	3	11	58											
				CONNECTED TO 3 11 58	3	11	59											

REPORT NO. AZC-27-059-4 [redacted]

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 4-E REPORT NO. AZC-27-059-4 DATE 16 AUG 60 PAGE 16

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE CONT.	3	13	0											
	I	517	A	ACCELEROMETER ZF1	3	1[illegible]				G							P	
	I	520	A	ACCELEROMETER ZF2	3	A				G							P	
	I	513	A	ACCEL XF1 DIRECT	3	C				G							P	
	I	514	A	ACCEL XF2 DIRECT	3	E				G							P	

SECTION 10

LANDLINE INSTRUMENTATION

The Landline Instrumentation presented in this section contains the latest available characteristics of the individual measurements. In addition the type of recordings indicated.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

UNITS OF FUNCTION

FREQUENCY RESPONSE

Denotes the frequency response requirements in cps of the instrumentation system for the measurement.

TRANSDUCER SERIAL NUMBER

A	F	1125	P	B CTL PNEU REG OUT	S	200	800	PIA	16	SLO	7	01731	3	2841	1243	4	27-16500
A	F	1194	P	FACILITY GN_2 SUPPLY	S	0	2400	PIG	48	SLO							
A	F	1288	P	ST PNEU REG OUT	S	0	800	PIA	10	SLO	7	01720	1		1223	2	27-16505
A	G	1036	V	PITCH ANALOG	D	M30	30	VDC	0.2	SLO							27-0001-3

MEASUREMENT NUMBER

ACCURACY REQUIREMENT

Present in units of the function measured.

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

RECORDER ASSIGNMENT

This code defines the method to be utilized to record the measurement. A double letter here indicates that this measurement will be recorded on two different types of recorders.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 4E LANDLINE REPORT NO. AZC-27-059-4 DATE 16 AUG 60 PAGE 1

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	D			RANGE SAFETY SYSTEM														
	D	M142	V	RSC #1 BAT DC		M											P	
	D	M143	V	RSC #2 BAT DC		M											P	
	D	M140	W	RSC #1 TOTAL TIMER		M		0	1000	HR							P	
	D	M141	W	RSC #2 TOTAL TIMER		M		0	1000	HR							P	
	D	M150	W	RSC #1 & 2 BATTERY		M		0	1000	HR							P	
	E			ELECTRICAL POWER SYS														
	E	M066	C	MISSILE DC AMPS		M		0	200	AMP							P	
	E	M068	C	EMERGENCY GENERATOR		M		0	200	AMP							P	
A	E	M005	Q	INVERTER FREQUENCY		M		350	450	CPS	4	SLO					P	
A	E	M029	Q	MISSILE EXT PHASE A		M		350	450	CPS	4	SLO					P	
	E	M031	Q	PHASE A EXT @ MSL		M		396	404	CPS							P	
A	E	M003	V	BATTERY OUTPUT		M		15	35	VDC	.6	SLO					P	
A	E	M006	V	INVERTER PHASE A		M		90	140	VAC	2.5	SLO					P	
	E	M022	V	MISSILE AC EXT @ MSL		M		110	120	VAC							P	
	E	M023	V	MISSILE EXTERNAL AC		M		110	120	VAC							P	
	E	M030	V	MISSILE DC EXT @ MSL		M		0	40	VDC							P	
	E	M065	V	MISSILE EXTERNAL DC		M		0	40	VDC							P	
	E	M109	W	MAIN MSL BATT TIMER		M											P	
	E	M110	W	INVERTER TIMER		M											P	
	F			PNEUMATIC SYSTEM														
A	F	1001	P	LO2 TANK HELIUM		O		0	50	PIA	1	SLO	27 01243 5	2063F	484	3	P	27-11679
A	F	M001	P	LO2 TANK HELIUM		M		0	50	PIA	1	SLO	27 01243 5	2063F	484	3	P	27-11679
	F	1003	P	FUEL TANK HELIUM		O		0	75	PIA	1.5	SLO	27 01243 7	0008F	948	3	P	27-11683

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	Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Range Low	Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer		Serial No	Station No.	Quadrant	Card Code	Drawing Numbers
		F	M003	P	FUEL TANK HELIUM	M			0	75	PIA	1.9	SLO	27 01243	7	0008F	948	3	P	27-11683
		F	M032	P	LN2 PRESSURE	M			0	4000	PIG								P	
		F	M053	P	NORM SUP PRESSURE	M			0	4000	PIG								P	
		F	M054	P	EMERG SUP PRESSURE	M			0	4000	PIG								P	
		F	M116	P	DIFFERENTIAL PRESS	M			0	5	PID								P	
		F	1149	P	S CTL HE BTL DISCH	S			0	3500	PIA	175	SLO	7 01720	5	5081	1213	2	P	27-11650
		F	M149	P	S CTL HE BTL DISCH	M			0	3500	PIA	175	SLO	7 01720	5	3079	1213	2	P	27-11650
A		F	1194	P	FACILITY GN2 SUPPLY	S			0	2500	PIA	48	SLO						P	
		F	1246	P	B TANK HE BOTTLES HI	S			0	3300	PIA	65	SLO	7 01720	5	3098	1200	4	P	27-11682
A		F	M246	P	B TANK HE BOTTLES HI	M			0	3500	PIA	65	SLO	7 01720	5	3098	1200	4	P	27-11682
A		F	M247	T	BSTR TANK TEMP	M			M320	M250	DGF	2	SLO	7 01633	5	22L	1221	4	P	27-11682
A		F	M290	T	SUST CTL TEMP	M			M100	M300	DGF	4	SLO	7 01633	7		1235	2	P	27-11650
		I			INERTIAL GUIDANCE															
		I	1515	A	ACCELEROMETER X F1	F													P	
		I	1516	A	ACCELEROMETER Y F1	F													P	
		I	1517	A	ACCELEROMETER Z F1	F													P	
		I	1518	A	ACCELEROMETER X F2	F													P	
		I	1519	A	ACCELEROMETER Y F2	F													P	
		I	1520	A	ACCELEROMETER Z F2	F													P	
		I	1591	C	PITCH GYRO TORQUE	D			M75	75	MA								P	
		I	1592	C	ROLL GYRO TORQUE	D			M75	75	MA								P	
		I	1593	C	YAW GYRO TORQUE	D			M75	75	MA								P	
		I	1594	D	PENDULUM #1 NULL	D	4		M20	20	MIN								P	
		I	1595	D	PENDULUM #2 NULL	D	5		M20	20	MIN								P	
		I	1596	D	OPTIC SIGNAL	D	6		M7.5	7.5	MIN								P	
		I	1505	H	COMPUTER POSITION X	F			0	6K	NM	10K							P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDERS	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
1	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	72	
	I	1506	H	COMPUTER POSITION Y		F		M300	500	NM		10K					P	
	I	1507	H	COMPUTER POSITION Z		F		0	700	NM		10K					P	
	I	1508	H	RANGE ERROR FUNCTION		F		0	6K	NM		10K					P	
	I	1309	H	AZM ERROR FUNCTION		F		M300	500	NM		10K					P	
	I	1502	L	COMPUTER VELOCITY X		F		0	22K	F/S		10K					P	
	I	1503	L	COMPUTER VELOCITY Y		F		0	4K	F/S		10K					P	
	I	1504	L	COMPUTER VELOCITY Z		F		0	6K	F/S		10K					P	
	I	1601	V	400 CPS REFERENCE		D											P	
A	I	1510	W	ELAPSED TIME		F		0	450	SEC							P	
	I	1521	X	VERN ENGINE COF SIG		D		ON	OFF								P	
	I	1522	X	S ENGINE COF SIG		D		ON	OFF								P	
	I	1570	X	STAGING SIG		D											P	
	I	1603	X	WORD GATE FIVE		F		ON	OFF								P	
	I	1604	X	MULT GATE SIX		F		ON	OFF								P	
	I	1605	X	112 CPS GATE		F		ON	OFF								P	
	L			LAUNCHER														
	L	1398	D	MSL VS DISCON 01 & 2		O		M1.0	2.0	IN	0.1	50					P	
	L	1399	D	MSL VS DISCON 03&4		O		M1.0	2.0	IN	0.1	50					P	
	M			MISCELLANEOUS														
	M	M144	V	STROBELIGHT BATTERY		M											P	
	M	1090	X	MSL ONE INCH MOTION		R		OFF	ON								P	
	N			FACILITIES & GSE														
	N	M362	D	36 INCH WATER VALVE		M											P	
	N	1310	P	SLUG CH LO2 DISCH		S		0	500	PIG		SLO					P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	N	1314	T	SLUG CH LO2 DISCH	S			M250	M325	DGF		SLO					P	
	N	1335	X	SLG CH LO2 DISCH VLV	R			OPEN	CLOS			SLO					P	
	N	1336	X	SLG CH LO2 VENT VLV	R			OPEN	CLOS			SLO					P	
	N	1337	X	SLG CH LO2 INLET VLV	R			OPEN	CLOS			SLO					P	
	N	1338	X	SLG CH LN2 INLET VLV	R			OPEN	CLOS			SLO					P	
	N	1339	X	SLG CH GN2 INLET VLV	R			OPEN	CLOS			SLO					P	
	P			PROPULS'ON SYSTEM														
A	P	1083	B	B2 PUMP SPEED	A			5680	6400	RPM	60	SLO					P	
A	P	1084	B	B1 PUMP SPEED	A			5680	6400	RPM	60	SLO					P	
	P	M242	B	PUMP LC SPEED	M			0	100	PCT							P	
A	P	1349	B	S PUMP SPEED	A			9.9	11.2	KPM	.1	SLO					P	
A	P	1528	D	SUS FUEL POS VALVE	S			0	87.5	DEG	2	SLO					P	
A	P	M685	M	FUEL IN MISSILE	M			0	10K	GAL							P	
A	P	1439	O	S NAA RCC ACCEL	A			0	200	G	5	10K					P	
A	P	1452	O	B1 NAA RCC ACCEL	A			0	200	G	5	2K					P	
A	P	1453	O	B2 NAA RCC ACCEL	A			0	200	G	5	2K					P	
A	P	1893	O	B1 NAA ACCEL BK U	A			0	80	G		2KC					P	
A	P	1894	O	B2 NAA ACCEL BK U	A			0	80	G		2KC					P	
	P	1001	P	B1 LO2 PUMP INLET	O			0	150	PIA		SLO	27 01243 9				P	
	P	1002	P	B1 FUEL PUMP INLET	O			0	150	PIA		SLO	27 01243 9				P	
	P	1003		B2 LO2 PUMP INLET	O			0	150	PIA		SLO	27 01243 9				P	
	P	1004	P	B2 FUEL PUMP INLET	O			0	150	PIA		SLO	27 01243 9				P	
	P	1010	P	B1 LUBE OIL INJ MAN	S			0	1000	PIG	50	SLO	7 01731 7	5751	1173	1	P	27-11721
	P	1011	P	B2 LUBE OIL INJ MAN	S			0	1000	PIG	50	SLO	7 01731 7	5750	1144	3	P	27-11722
	P	1189	P	B1 GAS GEN LO2 IN	O			0	1000	PIA		1K					P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
	P	1190	P	B2 GAS GEN LO2 IN		O		0	1000	PIA		1K					P	
	P	1232	P	S LO2 SEAL CAVITY		S		0	15	PIG	2	SLO	27 01243 5	15312	1235	X	P	27-117.0
	P	M373	P	LO2 STORAGE TANK		M		0	50	PIG							P	
A	P	M430	P	FUEL STORAGE TANK		M		0	10	PIG	.6	SLO					P	
	P	1465	P	S LO PR LUBE OIL MAN		S		0	100	PIG		SLO	27 01243 9	0054F	1235	X	P	27-11720
	P	1474	P	V CTL PRESS REG OUT		S		200	800	PIA	16	SLO	7 01731 3	4643	1208	Y	P	27-11651
	P	1020	T	B1 LO2 PUMP INLET		S		M325	M275	DGF		SLO	7 01649 9	772			P	
	P	1151	T	FUEL TK @ STA 1043		S		0	200	DGF	5	SLO	7 01684 13	405			P	
	P	1204	T	B1 TOPPING LINE OUT		S		M300	M270	DGF		20					P	
	P	1205	T	B2 TOPPING LINE OUT		S		M300	M270	DGF		20					P	
	P	1325	T	ENG COMP AMBIENT		S		M100	500	DGF	3	SLO	7 01684 5	273	1208	Y	P	27-11651
	P	1709	T	SGG COMBUSTOR		S		0	1500	DGF		5	27 01247 3	33L	1234	4	P	27-11720
	P	1710	T	SE ENVIRONMENT		S		M100	500	DGF		SLO	7 01684 5	170	1235	3	P	27-17540
	P	1711	T	B1 NACELLE AMBIENT		S		M100	500	DGF		SLO	7 01684 5	R283	1204	4	P	27-17546
	P	1712	T	B2 NACELLE AMBIENT		S		M100	500	DGF		SLO	7 01684 5	R284	1204	2	P	27-17546
	P	1713	T	B1 GAS GEN COMBUSTOR		S		0	1500	DGF	30	5	27 01247 3	52	1210	1	P	27-11721
	P	1714	T	B2 GAS GEN COMBUSTOR		S		0	1500	DGF	30	5	27 01247 3	57	1210	3	P	27-11722
A	P	1437	W	S RCC BINARY COUNTER		A		0	100	MS	.5	2KC					P	
A	P	1454	W	B1 RCC BINARY CNTR		A		0	100	MS	.5	2KC					P	
A	P	1455	W	B2 RCC BINARY CNTR		A		0	100	MS	.5	2KC					P	
	P	M849	W	LO2 SLUG XFER & FIRE		M											P	
A	P	1897	W	B1 RCC BIN CNT BK U		A		0	100	MS	.5	2KC					P	
A	P	1898	W	B2 RCC BIN CNT BK U		A		0	100	MS	.5	2KC					P	
	P	1155	X	OBSERVER CUTOFF		R		OFF	ON	VDC		STP	PEN 69				P	
	P	1161	X	TCC START SWITCH		R		OFF	ON	VDC		STP	PEN 6				P	
	P	1164	X	TCC ENGINE COF SW		R		OFF	ON	VDC		STP	PEN 67				P	
	P	1192	X	B1 ROUGH COMB COF		R		OFF	ON	VDC		STP	PEN 76				P	
	P	1193	X	B2 ROUGH COMB COF		R		OFF	ON	VDC		STP	PEN 77				P	
A	P	1225	X	ENGINE CONTROL READY		R		OFF	ON	VDC		STP					P	
A	P	1226	X	PNEUMATICS CUTOFF		R		OFF	ON	VDC		STP					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
	P	1227	X	LO2 DOME PURGE		R		OFF	ON	VDC		STP					P	
	P	1228	X	IGNITER FUEL PURGE		R		OFF	ON	VDC		STP					P	
	P	1229	X	LO2 HIGH TOPPING		R		OFF	ON	VDC		STP					P	
	P	1230	X	LO2 LOW TOPPING		R		OFF	ON	VDC		STP					P	
	P	1231	X	LO2 100% SLUG COM		R		OFF	ON	VDC		STP					P	
	P	1347	X	S CUTOFF RELAY		R		OFF	ON	VDC		STP	PEN 128				P	
	P	1438	X	S ROUGH COMB COF		R		OFF	ON	VDC		STP	PEN 78				P	
	P	1544	X	VERNIER CONTROL		R		OFF	ON	VDC		STP					P	
	P	1545	X	S IGN STAGE CONTROL		R		OFF	ON	VDC		STP					P	
	P	1546	X	B2 CUTOFF RELAY		R		OFF	ON	VDC		STP					P	
	P	1547	X	B1 CUTOFF RELAY		R		OFF	ON	VDC		STP					P	
	P	1548	X	COMPLETE COF RELAY		R		OFF	ON	VDC		STP					P	
	P	1549	X	IGNITION START		R		OFF	ON	VDC		STP					P	
	P	1785	X	B SECONDARY SHUTDOWN		S		OFF	ON	VDC		STP					P	
	P	1975	X	B1 RCC BACK-UP RELAY		R		OFF	ON	VDC		STP	PEN 73				P	
	P	1976	X	B2 RCC BACK-UP RELAY		R		OFF	ON	VDC		STP	PEN 80				P	
	S			AUTOPILOT SYSTEM														
	S	M358	D	ROLL PROGRAM READOUT		M											P	
	S	1048	V	PROGRAMMER PITCH SIG		D		0	2.7	VAC	.2	SLO					P	
	S	1049	V	PROGRAMMER ROLL SIG		D		0	60	VAC	3	STP					P	
	S	1107	V	B1 PCH ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1108	V	B2 PCH ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1113	V	V1 YAW ACTR FEEDBACK		D		M5	7	VAC	5%	30					P	
	S	1114	V	V2 YAW ACTR FEEDBACK		D		M5	7	VAC	5%	30					P	
	S	1118	V	V2 ROL ACTR FEEDBACK		D		M11	11	VAC	5%	30					P	
	S	1119	V	V1 ROL ACTR FEEDBACK		D		M11	11	VAC	5%	30					P	
	S	1121	V	GYRO TEST SIG		D		M5	5	VAC	.1	STP					P	
	S	1122	V	SERVO TEST SIGNAL		D		M11	11	VAC	5%	30					P	
	S	1128	V	B1 YAW ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1129	V	B2 YAW ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
3	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	73	
	S	1147	V	PITCH GYRO AMP OUT		D		M10	10	VAC	1	30					P	
	S	1148	V	YAW GYRO AMP OUT		D		M10	10	VAC	1	30					P	
	S	1149	V	ROLL GYRO AMP OUT		D		M10	10	VAC	1	30					P	
	S	1216	V	S PCH ACTR FEEDBACK		D		M10	10	VAC	5%	30					P	
	S	1217	V	S YAW ACTR FEEDBACK		D		M10	10	VAC	5%	30					P	
	S	M270	V	FINE HEATER-PITCH		M		0	150	VAC							P	
	S	M271	V	FINE HEATER-YAW		M		0	150	VAC							P	
	S	M272	V	FINE HEATER-ROLL		M		0	150	VAC							P	
	S	M176	W	PROGRAM RUN TIME		M		0	999	SEC							P	
A	S	M282	W	DECADE EVENT TIMER		M		0	10K	SEC							P	
	S	1235	X	PROGRAMMER RUN TIME		R		OFF	ON	VDC		STP					P	
	S	1370	X	STAGING		R		OFF	ON	VDC		STP					P	
	S	1371	X	BOOSTER JETTISON		R		OFF	ON	VDC		STP					P	
	S	1372	X	PRESSURIZE VERN TANK		R		OFF	ON	VDC		STP					P	
	S	1373	X	BOOSTER CUTOFF		R		OFF	ON	VDC		STP					P	
	S	1374	X	SUSTAINER CUTOFF		R		OFF	ON	VDC		STP					P	
A	S	1375	X	VSHPS BACK-UP SIG		R		OFF	ON	VDC		STP					P	
	S	1376	X	VERNIER CUTOFF		R		OFF	ON	VDC		STP					P	
	S	1377	X	EJECT RV UMBILICAL		R		OFF	ON	VDC		STP					P	
	S	1378	X	RV JETTISON		R		OFF	ON	VDC		STP					P	
	S	1379	X	FIRE RETRO ROCKETS		R		OFF	ON	VDC		STP					P	
	T			TELEMETERING SYSTEM														
	T	M140	V	TLM #1 BAT DC		M											P	
	T	M141	V	TLM #1 EXTERNAL DC		M											P	
	T	M144	V	TLM #2 BAT DC		M											P	
	T	M145	V	TLM #2 EXTERNAL DC		M											P	
	T	M146	V	TLM #3 BAT DC		M											P	
	T	M147	V	TLM #3 EXTERNAL DC		M											P	
	T	M156	V	TLM 1 FIL INT DC		M											P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	COOLANT	COLD DOC.	DRAWING NUMBERS
	T	M157	V	TLM 1 FIL EXT DC		M											P	
	T	M158	V	TLM 2 FIL INT DC		M											P	
	T	M159	V	TLM 2 FIL EXT DC		M											P	
	T	M160	V	TLM 3 FIL INT DC		M											P	
	T	M161	V	TLM 3 FIL EXT DC		M											P	
	T	M150	W	TLM #1 TOTAL		M		0	1000	HR							P	
	T	M151	W	TLM #2 TOTAL		M		0	1000	HR							P	
	T	M152	W	TLM #3 TOTAL		M		0	1000	HR							P	
	T	M153	W	TLM #1 BAT TIMER		M											P	
	T	M154	W	TLM #2 BAT TIMER		M											P	
	T	M155	W	TLM #3 BATTERY		M		0	60	MIN							P	
	U			PROPELLANT UTILIZ														
	U	1091	V	ERROR RATIO DEMOD OP		S		M20	20	VDC	.5	20					P	
	U	1200	X	LO2 100% SLUG COF-1		R		OFF	ON	VDC		STP					P	
	U	1201	X	LO2 TOPG HI CTL-1		R		OFF	ON	VDC		STP					P	
	U	1202	X	LO2 TOPG LO CTL-1		R		OFF	ON	VDC		STP					P	
	U	1203	X	LO2 95% RAPID LOAD-1		R		OFF	ON	VDC		STP					P	
	U	1204	X	FUEL 100% SEC CTL		R		OFF	ON	VDC		STP					P	
	U	1205	X	FUEL 100% PRI CTL		R		OFF	ON	VDC		STP					P	
	U	1206	X	FUEL 95% SEC CTL		R		OFF	ON	VDC		STP					P	
	U	1207	X	FUEL 95% PRI CTL		R		OFF	ON	VDC		STP					P	
	U	1208	X	LO2 100% SLUG COF-2		R		OFF	ON	VDC		STP					P	
	U	1209	X	LO2 TOPG HI CTL-2		R		OFF	ON	VDC		STP					P	
	U	1210	X	LO2 TOPG LO CTL-2		R		OFF	ON	VDC		STP					P	
	U	1211	X	LO2 95% RAPID LOAD-2		R		OFF	ON	VDC		STP					P	
	Y			DECOY SYSTEM														
	L			AZUSA SYSTEM														

CONFIDENTIAL

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DATE 10 May 1960
NO. OF PAGES 56

CONVAIR (ASTRONAUTICS) DIVISION
GENERAL DYNAMICS CORPORATION

WS-107A-1

INSTRUMENTATION CONFIGURATION

SERIES E ARTICLE 8

AMR

PREPARED BY TEST PLANNING

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REPORT NO. AZC-27-059-8
PAGE NO. A
31 October 1960

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
A	20 Oct. '60	WSB	ADDITIONS:	
			EM109W, EM110W, F3309D, F1194P, F3301P,	ALL TABS
			F3302P, F1826P, F1828P, F1827T, F1829T,	
			F3831T, F3832T, F3833T, F3834T, F3835T,	
			F3836T, F3837T, F3838T, G302C, G588P,	
			G589P, G281V, H52P, H130P, H185P,	
			I1606V, N3335X, N3336X, N3337X,	
			N3356X, N3932X, N3933X, N1979X, P155P,	
			P184P, P185P, P188P, P341P, P473P,	
			P1020T, P1054T, P1225X, P1226X, P1227X,	
			P1228X, P1229X, P1230X, P1231X, S1370X,	
			S1371X, S1372X, S1373X, S1374X, S1375X,	
			S1376X, S1377X, S1378X, S1379X, U1208X,	
			U1209X, U1210X, U1211X.	
			REASONS FOR REVISION "A" CHANGES	4-1
A	[illegible] Oct. '60	WSB	DELETIONS:	ALL TABS
			FM248P, F290T, FM290T, P419P, P420P,	
			P1279P, P1341P, P1473P, P1709T, P171[illegible]T,	

FORM NO. A-701-1

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
A	2? Oct '60	WSB	DELETIONS: (CONTD)	ALL TABS
			P1714T, Z2E	
			[illegible] HRM For PJL 17 Nov 60	

FOREWORD

This report has been published in accordance with contractual requirements as cited in Convair-Astronautics Report ZM-7-289. It describes the instrumentation released for missile 8E as of 31 October 1960. A

Information presented here will be used by Air Force, Associate Contractors, Design, Operation, and Field Test Groups. Measurement modification will either originate in the Instrumentation Planning Group or will be submitted as a recommendation to this group.

TABLE OF CONTENTS

(A)

(A)

SUMMARY

The instrumentation configuration for this missile has been established through a study of program test objectives, systems analysis, and operating considerations. A discussion of missile instrumentation and associated characteristics has been summarized in Report AZC-27-059. For a detailed description of the various missile systems, test objectives, and general test program see Report AZC-27-044.

The specific measurements to be transmitted via telemeter have been tabulated and are listed in Sections 8 and 9 in terms of instrumentation system and telemeter channel assignments.

In addition to the telemetry, the landline instrumentation program for this missile has been included in this report in the form of a master tabulation of landline measurement characteristics, (Section 10).

To clarify specific measurements, instrumentation location schematics have been included in Report AZC-27-059, Section 7.

REASONS FOR REVISION "A" CHANGES

I. The helium controls bottle charging line is being rerouted into the instrumentation port, no additional port is available. However the necessary design information will be gathered on prior missiles.

MEAS. NO.	DESCRIPTION	CHANNEL
DELETE		
F290T	S CTL HE BOTTLE	1.11.41
FM290T	S CTL HE BOTTLE	

II. The following measurements were added to provide a record for proof of proper sequence operation or data for failure analysis. These measurements will be made during the integrated systems tests of the A/P Programmer.

ADD	
S1370X	STAGING
S1371X	BOOSTER JETTISON
S1372X	PRESSURIZE VERN TANK
S1373X	BOOSTER CUTOFF
S1374X	SUSTAINER CUTOFF
S1375X	VSHPS BACK-UP SIGNAL
D1376X	VERNIER CUTOFF
S1377X	EJECT RV UMBILICAL
S1378X	RV JETTISON
S1379X	FIRE RETRO ROCKETS

III. Administrative difficulties make it desirable to assign different measurement numbers for the new CVA dual LO_2 tanking probes.

[redacted]

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MEAS. NO.	DESCRIPTION	CHANNEL
ADD		
U1208X	LO_2 100% SLUG COF - 2	
U1209X	LO_2 TOPG HI CTL - 2	
U1210X	LO_2 TOPG LO CTL - 2	
U1211X	LO_2 95% RAPID LOAD - 2	

IV. There is no sustainer LO_2 tank pressurization bottle on E series missiles, therefore the following measurement has been deleted.

DELETE		
FM248P	S TANK HE BOTTLE H1	

V. Complexity prohibits making or calibrating this measurement in a way that will yield valuable data for test evaluation.

DELETE		
Z2E	KLYSTRON PWR OUTPUT	1.11.1

VI. These measurements have been added to determine if proper sequencing of LO_2 slug transfer valves is occurring.

ADD		
N3335X	SLG CH LO_2 DISCH VLV	
N3932X	LO_2 TPNG VLV CLOSED	
N3933X	LO_2 TPNG VLV OPEN	
N3336X	SLG CH LO_2 VENT VLV	
N3356X	SLG CH LO_2 LOW LEVEL	
N3337X	SLG CH LO_2 INLET VLV	
N1979X	PRESS VLV CLOSED	

[redacted]

VII. The following instrumentation is required to evaluate and determine proper operation of the redesigned AIG pod air conditioning:

MEAS. NO.	DESCRIPTION
ADD	
F1826D	AIG POD AIR INLET Q-2
F1827T	AIG POD AIR INLET Q-2
F1828P	AIG POD AIR INLET Q-3
F1829T	AIG POD AIR INLET Q-3
F3831T	EXHAUST AREA AMB TEMP
F3832T	FWD FACE PLATF SKIN
F3833T	FWD FACE PLATF SKIN
F3834T	FWD FACE PLATF SKIN
F3835T	AFT FACE PLATF SKIN
F3836T	AFT FACE PLATF SKIN
F3837T	AFT FACE PLATF SKIN
F3838T	POD AMB TEMP

VIII. The following sequence measurements will be used for flight test and systems validation, by providing time-sequence of operation of these functions during ground checkout.

ADD	
P1225X	ENGINE CONTROL READY
P1226X	PNEUMATICS CUTOFF
P1227X	LO_2 DOME PURGE
P1228X	IGNITION FUEL PURGE
P1229X	LO_2 HIGH TOPPING
P1230X	LO_2 LOW TOPPING
P1231X	LO_2 100% SLUG

IX. The Booster Lox Pump Inlet temperature measurements have been added as operational redlines.

[redacted]
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MEAS. NO.	DESCRIPTION	CHANNEL
ADD		
P1054T	B2 LOX PUMP INLET	
P1020T	B1 LOX PUMP INLET	

X. The following measurement is added to ascertain the adequacy of the GN_2 supply during countdown and holds.

ADD		
F1194P	FACILITY GN_2 SUPPLY	

XI. The flight of missile 3-E revealed that data was insufficient to properly analyze operation of the airborne sustainer hydraulic system. These additional measurements are necessary to evaluate possible hydraulic system anomalities.

ADD		
H521P	S HYD ACCUMULATOR	1.A.3
H185P	S HYD PUMP INLET	2.11.41
H[illegible]0P	S HYD PUMP DISCH	1.A.21

XII. The following measurements will be used to determine the cause of impact predictor drop out experienced on the GE - IP System on "D" AIG flights.

ADD		
G588P	WAVEGUIDE PRESSURE 1	1.12.7
G589P	WAVEGUIDE PRESSURE 2	1.12.9
G281V	RB REFLECT SET	1.11.49
G302C	PB-IB MODULATOR AVG	1.11.53

XIII. In order to gain data on the performance of the MA-3 turbopump lube oil and pressurization systems during flight, 3 lube oil pressure measurements were switched from landline to telemetry.

MEAS. NO.	DESCRIPTION	CHANNEL
DELETE		
P1279P	B2 LO PR LUBE OIL MAN	
P1341P	S LUBE OIL MANIFOLD	
P1473P	B1 LO PR LUBE OIL MAN	
ADD		
P279P	B2 LO PR LUBE OIL MAN	2.11.43
P341P	S LUBE OIL MANIFOLD	2.11.47
P473P	B1 LO PR LUBE OIL MAN	2.11.45

XIV. The booster turbopump gearbox pressures will be recorded during flights to gain data on turbopump gearbox pressurization system performance and over-all turbopump reliability.

ADD		
P185P	B1 TURBOPUMP GEARBOX	2.11.49
P188P	B2 TURBOPUMP GEARBOX	2.11.51

XV. In order to assure that the orifices have been properly sized in the booster gas generator LO_2 feed lines, the following changes were made:

ADD		
P155P	B1 GAS GEN COMBUSTOR	1.12.23
P184P	B2 GAS GEN COMBUSTOR	1.12.33
DELETE		
P419P	B1 GG LO_2 INJ MAN	1.12.23
P420P	B2 GG LO_2 INJ MAN	1.12.33

XVI. This measurement will indicate the number of guidance computer off-on cycles and help to establish the computer run time when combined with measurement I1510W.

MEAS. NO.	DESCRIPTION	CHANNEL
ADD		
I1606V	COMPUTER RESET	

XVII. The following measurements are FRF instrumentation. Missile 8E will not be FRF'd.

DELETE		
P1709T	SGG COMBUSTOR	
P1713T	B1 GAS GEN COMBUSTOR	
P1714T	B2 GAS GEN COMBUSTOR	

SECTION 8

MISSILE INSTRUMENTATION BY SYSTEM

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by system.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

UNITS OF FUNCTION

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

A	F	1	P	LO_2 TANK HELIUM	1	11	35	0	45	PIA	SLO	7 01723 11		480	2		P	27-11608
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA	SLO	7 01723 13		925	Y		P	27-11609
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA	SLO	7 01731 3		1243	4		P	27-16500
A	F	260	P	B TANK HE BOTTLES LO	1	11	17	15	415	PIA	SLO	7 01727 1		1238	1		P	27-11600
A	F	261	P	S TANK HE BOTTLE LO	1	11	21	15	415	PIA	SLO	7 01727 1		1223	2		P	27-16505

MEASUREMENT NUMBER

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number assignment for the applicable measurement.

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

MISSILE INSTRUMENTATION LOG SHEET

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
1	2	3	4	5	6	7	8	9		10	11	12	13	13	14	15	17	
	A			AIRFRAME														
	A	285	I	THRUST SECT LITE B1	3	11	1	0	600	FTC			7 01709 1		1220	4	P	27-11733
	A	744	I	THRUST SECT LITE B2	3	11	3	0	600	FTC			7 01709 1		1220	2	P	27-11733
	A	488	T	AMB F STG VLV Q3	1	11	15	M100	300	DGF		SLO	27 01287 3	21272			P	27-11793
	A	638	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3	21268			P	27-11793
	A	639	T	AMB JET RAIL Q4	1	11	45	M100	300	DGF		SLO	27 01287 3	21768			P	27-11793
	A	640	T	FWD SIDE A FRAME Q4	1	11	31	M100	300	DGF		SLO	27 01287 3	21436			P	27-11793
	A	641	T	AMB F STG VLV Q1	1	11	37	M100	300	DGF		SLO	27 01287 3	21276			P	27-66793
	A	645	T	AMB FWD B1 Q4	1	11	33	M100	300	DGF		SLO	27 01287 3	21439			P	27-66794
	D			RANGE SAFETY SYSTEM														
	D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC		STP					P	
	D	1	V	RSC CUTOFF OUTPUT	1	6	5	0	31	VDC		BLP					M	
	D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	100K	UV		SLO		173			P	
	D	3	X	RSC DESTRUCT OUTPUT	2	E	95	0	30	VDC		STP					P	
	E			ELECTRICAL POWER SYS														
	E	50	Q	400 CYCLE AC PWRSUP	1	1		370	430	CPS		SLO					P	
	E	28	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC		SLO		11			P	
	E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC		SLO		11			P	
	E	53	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC		SLO		11			P	
	F			PNEUMATIC SYSTEM														
	F	1	P	LO2 TANK HELIUM	1	13	33	0	45	PIA		SLO	7 01723 11	3441	484	3	P	27-11679
	F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA		SLO	7 01723 13	3190	948	3	P	27-11683
	F	34	P	FUEL PRESS ORIFIC DP	1	13	51	0	7	PID		SLO	27 01280 3	1863	1127	1	P	

[redacted]

CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Subcarrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
																		27-11732
	F	65	P	LO2 TK HE LIN @ ORFC	1	A	51	0	45	PIA		SLO	27 01243 5	15300	1127	4	P	27-11732
	F	114	P	LO2 PRESS REG INLET	1	13	45	0	3000	PIA		SLO	7 01731 9	6842	1187	4	P	27-11682
	F	145	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA		SLO	7 01720 5	5631	1213	2	P	27-11650
	F	147	P	LO2 PRESS ORFC DP	1	A	49	0	5	PID		SLO	27 01280 1	.T10	/55X	3	P	27-11732
	F	212	P	FUEL PRESS ORIFIC IN	2	11	37	40	70	PIA		SLO	27 01243 7	0074F	1127	2	P	27-11732
	F	246	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA		SLO	7 01720 5	5651	1187	4	P	27-11682
	F	260	P	B TK HE BOTTLES LO	1	12	31	0	400	PIA		SLO	7 01727 1	4304	1187	4	P	27-11682
	F	17	T	FUEL PRESS ORIFIC IN	1	11	43	0	500	DGF		SLO	7 01684 3	50123	1120	1	P	27-11732
	F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01684 3	155R	1205	4	P	27-11682
	F	146	T	LO2 PRESS ORFC IN	1	11	11	0	500	DGF		SLO	7 01684 3	50126	1121	3	P	27-11732
	F	247	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01633 5	28	1221	4	P	27-11682
	G			RADIO GUIDANCE SYS														
A	G	302	C	PB-IP MODULATOR AVG	1	11	53	M1.7	0	VDC		SLO					P	
	G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA		SLO					P	
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E		SLO					P	
A	G	588	P	WAVEGUIDE PRESS 1	1	12	7	0	15	PIA		SL/	7 01255 1				P	
A	G	589	P	WAVEGUIDE PRESS 2	1	12	9	0	15	PIA		SLO	7 01255 1				P	
A	G	281	V	RB REFLECT SET	1	11	49	M2.5	0	VDC		SLO					P	
	G	503	V	MOD III PB AGC	1	11	17	0	M4.8	VDC		SLO					P	
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
	H			HYDRAULIC SYSTEM														
	H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA		SLO	7 01731 9	5076	1173	1	P	27-11721
	H	92	P	S HYD ACCUMULATOR	1	A	3	0	3500	PIA		SLO	7 01720 5				P	
	H	130	P	S HYD PUMP DISCH	1	A	21	0	3500	PIA		SLO	7 01720 5				P	
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA		SLO	7 01720 5	5872	1213	2	P	

[redacted]

CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 8-E REPORT NO AZC-27-059-8 DATE 31 OCT 60 PAGE 3

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
A	H	185	P	S HYD PUMP INLET	2	11	41	0	100	PIG		SLO	87 93900 048				P	27-11650
	I			INERTIAL GUIDANCE														
	I	513	A	ACCEL XF1 DIRECT	3	C				G							P	
	I	514	A	ACCEL XF2 DIRECT	3	E				G							P	
	I	516	A	ACCELEROMETER YF1	2	A				G							P	
	I	517	A	ACCELEROMETER ZF1	3	13				G							P	
	I	519	A	ACCELEROMETER YF2	2	C				G							P	
	I	520	A	ACCELEROMETER ZF2	3	A				G							P	
	I	549	D	PITCH SERVO ERROR	2	6		M4.6	4.1	MIN		20					P	
	I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20					M	
	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	DEG		100					P	
	I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
	I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100					M	
	I	552	D	REDNDT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35					P	
	I	552	D	REDNDT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
	I	505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	
	I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
	I	560	O	BINNACLE X AXIS	1	C	1	M10	10	G		800					P	
	I	561	O	BINNACLE Y AXIS	1	C	9	M10	10	G		800					P	
	I	562	O	BINNACLE Z AXIS	1	C	17	M10	10	G		800					P	

[redacted]

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MISSILE INSTRUMENTATION LOG SHEET

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
	I	564	O	COMPUTER X AXIS	1	C	25	M10	10	G		800					P	
A	I	565	O	COMPUTER Y AXIS	1	C	33	M10	10	G		800					P	
A	I	566	O	COMPUTER Z AXIS	1	C	41	M10	10	G		800					P	
	I	572	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
	I	531	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	
	I	532	T	GYRO 2	1	12	3	M6.3	6.3	DGC		SLO					P	
	I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
	I	534	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
	I	535	T	COMPUTER	1	12	19	0	50	DGC		SLO					P	
	I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	
	I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10					M	
	I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
	I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6					M	
	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
	I	540	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		SLO					P	
	I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
	I	543	V	COMPUTER M50 PSUP	3	9		M55	0	VDC		SLO					P	
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
	I	545	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
	I	547	V	COMPUTER 4 PSUP	1	13	43	0	6	VDC		SLO					P	
	I	548	V	COMPUTER 38 PSUP	1	12	41	0	42	VDC		SLO					P	
	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	
	I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
	I	510	W	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
	I	581	W	TIME T	2	8	S					BLP					P	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	521	X	VERN ENGINE COF SIG	2	6	5	OFF	ON			BLP					P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 8-E REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 5

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	522	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP					P	
	I	523	X	S&V COF RELAYS	2	10	S	OFF	ON			BLP					P	
	I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
	I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
	I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
	I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	M			MISCELLANEOUS														
	M	143	D	BOOSTER SEPARATION	3	7		0	8	IN		14	7 01676 1	LU149	1131	1	P	27-11723
	M	32	X	CONAX VALVE COMMAND	1	A	23	OFF	ON			STP					P	
	M	78	X	STROBE LIGHT OCCUR	1	C	95			VDC		STP					P	
	M	84	X	B STGG LATCH MSW 01	3	8		OFF	ON				87 44900 109			1	P	27-11797
	M	85	X	B STGG LATCH MSW 02	3	8		OFF	ON				87 44900 109			2	P	27-11797
	M	86	X	B STGG LATCH MSW 03	3	8		OFF	ON				87 44900 109			3	P	27-11797
	M	87	X	B STGG LATCH MSW 04	3	8		OFF	ON				87 44900 109			4	P	27-11797
	P			PROPULSION SYSTEM														
	P	83	B	B2 PUMP SPEED	1	2		5680	6400	RPM		SLO	27 01267 11	19	1198	2	P	27-11722
	P	84	B	B1 PUMP SPEED	2	2		5680	6400	RPM		SLO	27 01267 1	25	1198	4	P	27-11721
	P	349	B	S PUMP SPEED	1	3		9.9	11.2	KPM		SLO	27 01264 3	49N	1234	3	P	27-11720
	P	528	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG		SLO	NAA				P	
	P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG		SLO	NAA		1205	X	P	27-17564
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA		150	7 01731 5	6597	1235	X	P	27-11720
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA		SLO	7 01720 3	3554	1208	Y	P	27-11651
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA		SLO	7 01737 3	1319	1127	4	P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA		SLO	7 01737 3	1207	1127	2	P	

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SECTION 8

31 OCTOBER 1960

CONVAIR-ASTRONAUTICS

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MISSILE 8-E REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 6

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
																		27-11699
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA		SLO	7 01720 3	3574	1208	Y	P	27-11651
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA		15	7 01731 5	6579	1144	3	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	P91		15	7 01731 5	6567	1173	1	P	27-11721
	P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA		SLO	27 01243 9	D0023	1235	X	P	27-11720
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA		15	7 01731 1	5421	1244	Y	P	27-11684
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA		15	7 01731 1	4761	1244	Y	P	27-11684
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA		SLO	7 01731 5	6243	1244	Y	P	27-11684
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA		SLO	7 01731 5	5445	1244	Y	P	27-11684
	P	155	P	B1 GAS GEN COMBUSTOR	1	12	23	0	1000	PIA		SLO	7 01731 5	6561	1173	1	P	27-11722
	P	184	P	B2 GAS GEN COMBUSTOR	1	12	33	0	1000	PIA		SLO	7 01731 5	6405	1144	3	P	27-11720
	P	185	P	B1 TURBOPUMP GEARBOX	2	11	49	0	15	PIG		SLO	27 01243 5	15301			P	
	P	188	P	B2 TURBOPUMP GEARBOX	2	11	51	0	15	PIG		SLO	27 01243 5	16108			P	
	P	279	P	B2 LO PR LUB OIL MAN	2	11	43	0	125	PIA		SLO	27 01243 9	0071F			P	
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA		15	7 01731 7	5726	1235	X	P	27-11720
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA		SLO	7 01731 5	6580	1235	X	P	27-11720
	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA		SLO	7 01731 7	5627			P	
	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA		SLO	7 01731 5	6565	1235	X	P	27-11721
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIA		SLO	27 01243 9	0036F			P	
	P	474	P	V CYL PRESS REG OUT	1	A	15	0	1000	PIA		SLO	7 01720 1	5821	1208	Y	P	27-11651
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	59	1197	X	P	27-11720
	P	671	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	27 01287 3	21318			P	
	P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 01247 3	73L	1234	3	P	27-11720
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247 3	72L	1210	1	P	27-11721
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247 3	80L	1210	3	P	27-11722
	P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	P	547	X	B1 CUTOFF RELAY	1	7	5	0	28	VDC		STP					P	
	P	548	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP					P	
	S			AUTOPILOT SYSTEM														
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG		5		11			P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG		5		11			P	
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG		5		11			P	
	S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG		10	7 01680 7	737	1212	Y	P	
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG		30	7 01680 7	737	1212	Y	M	27-11721
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG		10	7 01680 7	893	1212	Y	P	27-11722
	S	205	D	B1 YAW	1	6		M5	5	DEG		10	7 01680 7	955	1212	4	P	
	S	205	D	B1 YAW	2	11	5	M5	5	DEG		30	7 01680 7	955	1212	4	M	27-11721
	S	206	D	B2 YAW	2	E	19	M5	5	DEG		10	7 01680 7	871	1212	2	P	27-11722
	S	222	D	V1 PITCH	2	E	7	0	50	DEG		10	7 01414 1	08327	1123	4	P	27-11699
	S	223	D	V2 PITCH	2	E	5	0	50	DEG		10	7 01414 1	07675	1123	2	P	27-11699
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG		10	27 01205 1	290	1124	4	P	27-11699
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG		10	27 01205 1	305	1129	2	P	27-11699
	S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG		6	7 01680 9	939	1210	Y	P	
	S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG		30	7 01680 9	939	1210	Y	M	27-11720
	S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG		6	7 01680 3	1004	1210	X	P	
	S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG		30	7 01680 3	1004	1210	X	M	27-11720
	S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S		15		22			P	
	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S		15					M	
	S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S		15		22			P	
	S	53	R	PITCH RATE GYRO SIG	2	11	11	M[illegible]	6	D/S		15					M	
	S	54	R	YAW RATE GYRO SIG	1	8		M6	6	D/S		15		22			P	
	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S		15					M	
	S	248	X	A/P PG SWITCH 17	1	13	3	OFF	ON	VDC		STP					P	
	T			TELEMETERING														
	T	2	T	B1 T/C REFER JUNCT	1	11	19	0	200	DGF		SLO	27 01287 1	22143	1173	1	P	27-11721
	T	3	T	S T/C REFER JUNCT	1	11	23	0	200	DGF		SLO	27 01287 1	22160	1235	X	P	27-11720
	U			PROPELLANT UTILIZ														
	U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID		SLO	27 01280 1	277	948	3	P	27-11683
	U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01280 1	314D	948	3	P	

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MISSILE INSTRUMENTATION LOG SHEET

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
																		27-11585
	U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC		SLO		11			P	
	Y			PAYLOAD														
	Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
	Z			AZUSA														
	Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM		3		731			P	

SECTION 9

MISSILE INSTRUMENTATION BY CHANNEL

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by channel.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

UNITS OF FUNCTION

A	P	29	P	V2 THRUST CHAMBER	1	11	5	0	400	PIA		SLO	7	01737	1		1126	2	P	27-11614
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA		SLO	7	01731	7		1243	4	P	27-16500
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA		SLO	7	01723	13		925	Y	P	27-11609
A	P	671	T	TH SECT AMB QUAD 4	1	11	11	10	700	DGF		SLO	7	01684	9		1230	4	P	27-11599

MEASUREMENT NUMBER

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number for the applicable measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 8-E REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 1

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO.	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE-CONT.	1	0	0											
	E	50	Q	400 CYCLE AC PWRSUP	1	1		370	430	CPS		SLO					P	
	P	83	B	B2 PUMP SPEED	1	2		5680	6400	RPM		SLO	27 01267 11	19	1198	2	P	27-11722
	P	349	B	S PUMP SPEED	1	3		9.9	11.2	KPM		SLO	27 012[illegible] 3	49N	1234	3	P	27-11720
	S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG		6	7 01680 9	939	1210	Y	P	27-11720
	S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG		6	7 01680 3	1004	1210	X	P	27-11720
	S	205	D	B1 YAW	1	6		M5	5	DEG		10	7 01680 7	955	1212	4	P	27-11721
	D	1	V	RSC CUTOFF OUTPUT	1	6	S	0	31	VDC		BLP					M	
	S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG		10	7 01680 7	737	1212	Y	P	27-11721
	P	547	X	B1 CUTOFF RELAY	1	7	S	0	28	VDC		STP					P	
	S	54	R	YAW RATE GYRO SIG	1	8		M6	6	D/S		15		22			P	
	S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S		15		22			P	
	S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S		15		22			P	

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MISSILE 8-E REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 2

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
				COMM. RATE 2.5 RPS	1	11	0											
					1	11	1											
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E		SLO					P	
	F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01684 3	155R	1205	4	P	27-11682
	G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA		SLO					P	
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	59	1197	X	P	27-11720
	F	146	T	LO2 PRESS ORFC IN	1	11	11	0	500	DGF		SLO	7 01684 3	50126	1121	3	P	27-11732
	A	638	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3	21268			P	27-11793
	A	488	T	AMB F STG VLV Q3	1	11	15	M100	300	DGF		SLO	27 01287 3	21272			P	27-11793
	G	503	V	MOD III PB AGC	1	11	17	0	M4.8	VDC		SLO					P	
	T	2	T	B1 T/C REFER JUNCT	1	11	19	0	200	DGF		SLO	27 01287 1	22143	1173	1	P	27-11721
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
	T	3	T	S T/C REFER JUNCT	1	11	23	0	200	DGF		SLO	27 01287 1	22160	1235	X	P	27-11720
				100% CALIB	1	11	25											
				0% CALIB	1	11	27											
				0% CALIB	1	11	29											
	A	640	T	FWD SIDE A FRAME Q4	1	11	31	M100	300	DGF		SLO	27 01287 3	21436			P	27-11793
	A	645	T	AMB FWD B1 Q4	1	11	33	M100	300	DGF		SLO	27 01287 3	21439			P	27-66794
	F	247	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01633 5	28	1221	4	P	27-11682
	A	641	T	AMB F STG VLV Q1	1	11	37	M100	300	DGF		SLO	27 01287 3	21276			P	27-66793
	P	671	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	27 01287 3	21318			P	
					1	11	41											
	F	17	T	FUEL PRESS ORIFIC IN	1	11	43	0	500	DGF		SLO	7 01684 3	50123	1120	1	P	27-11732
	A	639	T	AMB JET RAIL Q4	1	11	45	M100	300	DGF		SLO	27 01287 3	21768			P	27-11793
	G	503	V	CONNECTED TO 1 11 17	1	11	47											
A	G	281	V	RB REFLECT SET	1	11	49	M2.5	0	VDC		SLO					P	
	G	579	V	CONNECTED TO 1 11 21	1	11	51											
A	G	302	C	PB-IP MODULATOR AVG	1	11	53	M1.7	0	VDC		SLO					P	
				SYNC & 100% CALIB	1	11	55											
				CONNECTED TO 1 11 55	1	11	56											
				CONNECTED TO 1 11 56	1	11	57											
				CONNECTED TO 1 11 57	1	11	58											
				CONNECTED TO 1 11 58	1	11	59											

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CONVAIR-ASTRONAUTICS

REPORT NO. AZC-27-059-8

SECTION 9

31 OCTOBER 1960

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 8-E REPORT NO AZC-27-059-8 DATE 31 OCT 60 PAGE 3

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUBCARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 5 RPS	1	12	0											
	I	531	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	
	I	532	T	GYRO 2	1	12	3	M6.3	6.3	DGC		SLO					P	
	I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
A	G	588	P	WAVEGUIDE PRESS 1	1	12	7	0	15	PIA		SL/	7 01255 1				P	
A	G	589	P	WAVEGUIDE PRESS 2	1	12	9	0	15	PIA		SLO	7 01255 1				P	
	I	540	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		SLO					P	
	I	534	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
	I	572	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
	F	145	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA		SLO	7 01720 5	5631	1213	2	P	27-11650
	I	535	T	COMPUTER	1	12	19	0	50	DGC		SLO					P	
	I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
	P	155	P	B1 GAS GEN COMBUSTOR	1	12	23	0	1000	PIA		SLO	7 01731 5	6561	1173	1	P	27-11722
				100% CALIB	1	12	25											
				0% CALIB	1	12	27											
				50% CALIB	1	12	29											
	F	260	P	B TK HE BOTTLES LO	1	12	31	0	400	PIA		SLO	7 01727 1	4304	1187	4	P	27-11682
	P	184	P	B2 GAS GEN COMBUSTOR	1	12	33	0	1000	PIA		SLO	7 01731 5	6405	1144	3	P	27-11720
	I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
	P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG		SLO	NAA		1205	X	P	27-17564
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
	I	548	V	COMPUTER 38 PSUP	1	12	41	0	42	VDC		SLO					P	
	H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA		SLO	7 01731 9	5076	1173	1	P	27-11721
	I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
	I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA		SLO	7 01720 5	5872	1213	2	P	27-11650
	F	246	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA		SLO	7 01720 5	5651	1187	4	P	27-11682
				SYNC & 100% CALIB	1	12	55											
				CONNECTED TO 1 12 55	1	12	56											
				CONNECTED TO 1 12 56	1	12	57											
				CONNECTED TO 1 12 57	1	12	58											
				CONNECTED TO 1 12 58	1	12	59											

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 8-E REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 4

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Cable Code	Drawing Numbers
				COMM. RATE 5 RPS	1	13	0											
					1	13	1											
	S	248	X	A/P PG SWITCH 17	1	13	3	OFF	ON	VDC		STP					P	
	P	548	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP					P	
	D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC		STP					P	
	P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	E	28	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC		SLO		11			P	
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA		SLO	7 01720 3	3574	1208	Y	P	27-11651
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA		SLO	7 01731 5	5445	1244	Y	P	27-11684
	P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA		SLO	27 01243 9	D0023	1235	X	P	27-11720
					1	13	19											
	U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01280 1	3140	948	3	P	27-11683
	E	53	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC		SLO		11			P	
				100% CALIB	1	13	25											
				0% CALIB	1	13	27											
				50% CALIB	1	13	29											
	U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID		SLO	27 01280 1	277	948	3	P	27-11683
	F	1	P	LO2 TANK HELIUM	1	13	33	0	45	PIA		SLO	7 01723 11	3441	484	3	P	27-11679
					1	13	35											
	F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA		SLO	7 01723 13	3190	548	3	P	27-11683
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA		SLO	7 01731 5	6243	1244	Y	P	27-11684
	I	545	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
	I	547	V	COMPUTER 4 PSUP	1	13	43	0	6	VDC		SLO					P	
	F	114	P	LO2 PRESS REG INLET	1	13	45	0	3000	PIA		SLO	7 01731 9	6842	1187	4	P	27-11682
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA		SLO	7 01720 3	3554	1208	Y	P	27-11651
	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA		SLO	7 01731 5	6565	1235	X	P	27-11721
	F	34	P	FUEL PRESS ORIFIC DP	1	13	51	0	7	PID		SLO	27 01280 3	1863	1127	1	P	27-11732
	E	53	V	CONNECTED TO 1 13 23	1	13	53											
				SYNC & 100% CALIB	1	13	55											
				CONNECTED TO 1 13 55	1	13	56											
				CONNECTED TO 1 1[illegible] 56	1	13	57											
				CONNECTED TO 1 13 57	1	13	58											
				CONNECTED TO 1 13 58	1	13	59											

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 6-E REPORT NO AZC-27-059-8 DATE 31 OCT 60 PAGE 5

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
				COMM. RATE 10 RPS	1	A	0											
	E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC		SLO		11			P	
A	H	52	P	S HYD ACCUMULATOR	1	A	3	0	3500	PIA		SLO	7 01720 5				P	
	D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	100K	UV		SLO		173			P	
	U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC		SLO		11			P	
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG		5		11			P	
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG		5		11			P	
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG		5		11			P	
	P	474	P	V CTL PRESS REG OUT	1	A	15	0	1000	PIA		SLO	7 01720 1	5821	1208	V	P	27-11651
	Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM		3		731			P	
	Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
A	H	13J	P	S HYD PUMP DISCH	1	A	21	0	3500	PIA		SLO	7 01720 5				P	
	M	32	X	CONAX VALVE COMMAND	1	A	23	OFF	ON			STP					P	
				100% CALIB	1	A	25											
				0% CALIB	1	A	27											
				50% CALIB	1	A	29											
	P	337	F	SGG LO2 INJ MAN	1	A	31	0	1000	PIA		SLO	7 01731 5	6580	1235	X	P	27-11720
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA		SLO	7 01737 3	1319	1127	4	P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA		SLO	7 01737 3	1207	1127	2	P	27-11699
	U	91	V	CONNECTED TO 1 A 7	1	A	37											
	S	61	D	CONNECTED TO 1 A 9	1	A	39											
	S	62	D	CONNECTED TO 1 A 11	1	A	41											
	S	63	D	CONNECTED TO 1 A 13	1	A	43											
	P	526	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG		SLO	NAA				P	
	Z	3	E	CONNECTED TO 1 A 17	1	A	47											
	F	147	P	LO2 PRESS ORFC DP	1	A	49	0	5	PID		SLO	27 01280 1	.T10	/5SX	3	P	27-11732
	F	65	P	LO2 TK HE LIN @ ORFC	1	A	51	0	45	PIA		SLO	27 01243 5	15300	1127	4	P	27-11732
	M	32	X	CONNECTED TO 1 A 23	1	A	53											
				SYNC & 100% CALIB	1	A	55											
				CONNECTED TO 1 A 55	1	A	56											
				CONNECTED TO 1 A 56	1	A	57											
				CONNECTED TO 1 A 57	1	A	58											
				CONNECTED TO 1 A 58	1	A	59											

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	Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No.	Quadrant	Card Code	Drawing Numbers
					COMM. RATE 1/8 RPS	1	C	0											
		I	560	0	BINNACLE X AXIS	1	C	1	M10	10	G		800					P	
		I	560	0	CONNECTED TO 1 C 1	1	C	2											
		I	560	0	CONNECTED TO 1 C 2	1	C	3											
		I	560	0	CONNECTED TO 1 C 3	1	C	4											
		I	560	0	CONNECTED TO 1 C 4	1	C	5											
		I	560	0	CONNECTED TO 1 C 5	1	C	6											
		I	560	0	CONNECTED TO 1 C 6	1	C	7											
		I	561	0	BINNACLE Y AXIS	1	C	9	M10	10	G		800					P	
		I	561	0	CONNECTED TO 1 C 9	1	C	10											
		I	561	0	CONNECTED TO 1 C 10	1	C	11											
		I	561	0	CONNECTED TO 1 C 11	1	C	12											
		I	561	0	CONNECTED TO 1 C 12	1	C	13											
		I	561	0	CONNECTED TO 1 C 13	1	C	14											
		I	561	0	CONNECTED TO 1 C 14	1	C	15											
		I	562	0	BINNACLE Z AXIS	1	C	17	M10	10	G		800					P	
		I	562	0	CONNECTED TO 1 C 17	1	C	18											
		I	562	0	CONNECTED TO 1 C 18	1	C	19											
		I	562	0	CONNECTED TO 1 C 19	1	C	20											
		I	562	0	CONNECTED TO 1 C 20	1	C	21											
		I	562	0	CONNECTED TO 1 C 21	1	C	22											
		I	562	0	CONNECTED TO 1 C 22	1	C	23											
		I	564	0	COMPUTER X AXIS	1	C	25	M10	10	G		800					P	
A		I	564	0	CONNECTED TO 1 C 25	1	C	26											
A		I	564	0	CONNECTED TO 1 C 26	1	C	27											
A		I	564	0	CONNECTED TO 1 C 27	1	C	28											
A		I	564	0	CONNECTED TO 1 C 28	1	C	29											
A		I	564	0	CONNECTED TO 1 C 29	1	C	30											
A		I	564	0	CONNECTED TO 1 C 30	1	C	31											
A		I	565	0	COMPUTER Y AXIS	1	C	33	M10	10	G		800					P	
A		I	565	0	CONNECTED TO 1 C 33	1	C	34											
A		I	565	0	CONNECTED TO 1 C 34	1	C	35											
A		I	565	0	CONNECTED TO 1 C 35	1	C	36											

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Vehicle (1)	System (2)	Measurement Number (3)	Type Measurement (4)	Description (5)	Telemeter No (6)	Sub-Carrier No (7)	Commutator Pin No (8)	Measurement Range Low (9)	Measurement Range High (9)	Units of Function (10)	Accuracy (11)	Rate of Change or Frequency of Function (12)	Type of Transducer (13)	Serial No. (14)	Station No. (15)	Quadrant (16)	Card Code (17)	Drawing Numbers
A	I	565	O	CONNECTED TO 1 C 36	1	C	37											
A	I	565	O	CONNECTED TO 1 C 37	1	C	38											
A	I	565	O	CONNECTED TO 1 C 38	1	C	39											
A	I	566	O	COMPUTER Z AXIS	1	C	41	M10	10	G		800					P	
A	I	566	O	CONNECTED TO 1 C 41	1	C	42											
A	I	566	O	CONNECTED TO 1 C 42	1	C	43											
A	I	566	O	CONNECTED TO 1 C 43	1	C	44											
A	I	566	O	CONNECTED TO 1 C 44	1	C	45											
A	I	566	O	CONNECTED TO 1 C 45	1	C	46											
A	I	566	O	CONNECTED TO 1 C 46	1	C	47											
				0% CALIB	1	C	49											
				50% CALIB	1	C	51											
				100% CALIB	1	C	53											
				SYNC & 100% CALIB	1	C	55											
				CONNECTED TO 1 C 55	1	C	56											
				CONNECTED TO 1 C 56	1	C	57											
				CONNECTED TO 1 C 57	1	C	58											
				CONNECTED TO 1 C 58	1	C	59											
	M	78	X	STROBE LIGHT OCCUR	1	C	95			VDC		STP					P	

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MISSILE 8-E REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 8

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
				DIGITAL CHANNEL	1	E	0											
	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
	I	510	W	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
	I	505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
	I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
				COMM. RATE CONT.	2	0	0											
					2	1												
	P	84	B	61 PUMP SPEED	2	2		5680	6400	RPM		SLO	27 01267 1	25	1198	4	P	27-11721
	I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
	I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	
	I	549	D	PITCH SERVO ERROR	2	6		M4.6	4.1	MIN		20					P	
	I	521	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP					P	
	I	552	D	REDNDT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35					P	
	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	
	I	581	W	TIME T	2	8	S					BLP					P	
	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	DEG		100					P	
	I	522	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP					P	
	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
	I	523	X	S&V COF RELAYS	2	10	S	OFF	ON			BLP					P	

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MISSILE 8-E REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 10

VEHICLE (1)	SYSTEM (2)	MEASUREMENT NUMBER (3)	TYPE MEASUREMENT (4)	DESCRIPTION (5)	TELEMETER NO. (6)	SUB-CARRIER NO. (7)	COMMUTATOR PIN NO. (8)	MEASUREMENT RANGE LOW (9)	MEASUREMENT RANGE HIGH (9)	UNITS OF FUNCTION (10)	ACCURACY (11)	RATE OF CHANGE OR FREQUENCY OF FUNCTION (12)	TYPE OF TRANSDUCER (13)	SERIAL NO. (14)	STATION NO. (15)	QUADRANT (16)	CARD CODE (17)	DRAWING NUMBERS
				COMM. RATE 2.5 RPS	2	11	0											
	S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG		30	7 01680 9	939	1210	Y	M	
	S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG		30	7 01680 3	1004	1210	X	M	
	S	205	D	B1 YAW	2	11	5	M5	5	DEG		30	7 01680 7	955	1212	4	M	
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG		30	7 01680 7	737	1212	Y	M	
	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S		15					M	
	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S		15					M	
	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S		15					M	
	I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6					M	
	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
	I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10					M	
	I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20					M	
	I	552	D	REDNDT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
				100% CALIB	2	11	25											
				0% CALIB	2	11	27											
				50% CALIB	2	11	29											
	I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
	I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
	I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100					M	
	F	212	P	FUEL PRESS ORIFIC IN	2	11	37	40	70	PIA		SLO	27 01243 7	0074F	1127	2	P	27-11732
					2	11	39											
A	H	185	P	S HYD PUMP INLET	2	11	41	0	100	PIG		SLO	87 93900 048				P	
	P	279	P	B2 LO PR LUB OIL MAN	2	11	43	0	125	PIA		SLO	27 01243 9	0071F			P	
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIA		SLO	27 01243 9	0036F			P	
	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA		SLO	7 01731 7	5627			P	
	P	185	P	B1 TURBOPUMP GEARBOX	2	11	49	0	15	PIG		SLO	27 01243 5	15301			P	
	P	188	P	B2 TURBOPUMP GEARBOX	2	11	51	0	15	PIG		SLO	27 01243 5	16108			P	
					2	11	53											
				SYNC & 100% CALIB	2	11	55											
				CONNECTED TO 2 11 55	2	11	56											
				CONNECTED TO 2 11 56	2	11	57											
				CONNECTED TO 2 11 57	2	11	58											
				CONNECTED TO 2 11 38	2	11	59											

[redacted]
CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 8-F REPORT NO AZC-27-059-8 DATE 31 OCT 60 PAGE 11

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Calib Code	Drawing Numbers
				COMM. RATE CONT.	2	12	0											
					2	12												
					2	13												
	I	516	A	ACCELEROMETER YF1	2	A				G							R	
	I	519	A	ACCELEROMETER YF2	2	C				G							R	

CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 8-E REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 12

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	EMITTER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 30 RPS	2	E	0											
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA		150	7 01731 5	6597	1235	X	P	27-11720
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA		15	7 01731 7	5726	1235	X	P	27-11720
	S	223	D	V2 PITCH	2	E	5	0	50	DEG		10	7 01414 1	07675	1123	2	P	27-11699
	S	222	D	V1 PITCH	2	E	7	0	50	DEG		10	7 01414 1	08327	1123	4	P	27-11699
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA		15	7 01731 1	4761	1244	Y	P	27-11684
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA		15	7 01731 1	5421	1244	Y	P	27-11684
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG		10	27 01205 1	290	1124	4	P	27-11699
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG		10	7 01680 7	893	1212	Y	P	27-11722
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG		10	27 01205 1	305	1129	2	P	27-11699
	S	206	D	B2 YAW	2	E	19	M5	5	DEG		10	7 01680 7	871	1212	2	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	P91		15	7 01731 5	6567	1173	1	P	27-11721
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA		15	7 01731 5	6579	1144	3	P	27-11722
				100% CALIB	2	E	25											
				0% CALIB	2	E	27											
				50% CALIB	2	E	29											
	P	6	P	CONNECTED TO 2 E 1	2	E	31											
	P	330	P	CONNECTED TO 2 E 3	2	E	33											
	S	223	D	CONNECTED TO 2 E 5	2	E	35											
	S	222	D	CONNECTED TO 2 E 7	2	E	37											
	P	60	P	CONNECTED TO 2 E 9	2	E	39											
	P	59	P	CONNECTED TO 2 E 11	2	E	41											
	S	233	D	CONNECTED TO 2 E 13	2	E	43											
	S	204	D	CONNECTED TO 2 E 15	2	E	45											
	S	234	D	CONNECTED TO 2 E 17	2	E	47											
	S	206	D	CONNECTED TO 2 E 19	2	E	49											
	P	39	P	CONNECTED TO 2 E 21	2	E	51											
	P	38	P	CONNECTED TO 2 E 23	2	E	53											
				SYNC & 100% CALIB	2	E	55											
				CONNECTED TO 2 E 55	2	E	56											
				CONNECTED TO 2 E 56	2	E	57											
				CONNECTED TO 2 E 57	2	E	58											
				CONNECTED TO 2 E 58	2	E	59											
	D	3	X	RSC DESTRUCT OUTPUT	2	E	95	0	30	VDC		STP					P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 8-E REPORT NO AZC-27-059-8 DATE 31 OCT 60 PAGE 13

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	S-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
				COMM. RATE CONT.	3	0	0											
	M	143	D	BOOSTER SEPARATION	3	7		0	8	IN		14	7 01676 1	LU149	1131	1	P	27-11723
	M	84	X	B STGG LATCH MSW Q1	3	8		OFF	ON				87 44900 109			1	P	
	M	85	X	B STGG LATCH MSW Q2	3	8		OFF	ON				87 44900 109			2	P	
	M	86	X	B STGG LATCH MSW Q3	3	8		OFF	ON				87 44900 109			3	P	
	M	87	X	B STGG LATCH MSW Q4	3	8		OFF	ON				87 44900 109			4	P	27-11797
	I	543	V	COMPUTER M50 PSUP	3	9		M55	0	VDC		SLO					P	

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SECTION 9

31 OCTOBER 1960

CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 8-E REPORT NO AZC-27-059-8 DATE 31 OCT 60 PAGE 14

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Subcarrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type Transducer	Serial No.	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE 2.5 RPS	3	11	0											
	A	285	I	THRUST SECT LITE B1	3	11	1	0	600	FTC			7 01709 1		1220	4	P	27-11733
	A	744	I	THRUST SECT LITE B2	3	11	3	0	600	FTC			7 01709 1		1220	2	P	27-11733
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247 3	72L	1210	1	P	27-11721
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247 3	80L	1210	3	P	27-11722
	P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 01247 3	73L	1234	3	P	27-11720
					3	11	11											
					3	11	13											
					3	11	15											
					3	11	17											
					3	11	19											
					3	11	21											
					3	11	23											
				100% CALIB	3	11	25											
				0% CALIB	3	11	27											
				0% CALIB	3	11	29											
					3	11	31											
					3	11	33											
					3	11	35											
					3	11	37											
					3	11	39											
					3	11	41											
					3	11	43											
					3	11	45											
					3	11	47											
					3	11	49											
					3	11	51											
					3	11	53											
				SYC & 100% CALIB	3	11	55											
				CONNECTED TO 3 11 55	3	11	56											
				CONNECTED TO 3 11 56	3	11	57											
				CONNECTED TO 3 11 57	3	11	58											
				CONNECTED TO 3 11 58	3	11	59											

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 8-E REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 15

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
				COMM. RATE CONT.	3	13	0											
	I	517	A	ACCELEROMETER ZF1	3	13				G							P	
	I	520	A	ACCELEROMETER ZF2	3	A				G							P	
	I	513	A	ACCEL XF1 DIRECT	3	C				G							P	
	I	514	A	ACCEL XF2 DIRECT	3	E				G							P	

SECTION 10

LANDLINE INSTRUMENTATION

The Landline Instrumentation presented in this section contains the latest available characteristics of the individual measurements. In addition the type of recordings indicated.

A	F	1125	P	B CTL PNEU REG OUT	S	200	800	PIA	16	SLO	7	01731	3	2841	1243	4	27-16500
A	F	1194	P	FACILITY GN_2 SUPPLY	S	0	2400	PIG	48	SLO							
A	F	1.88	P	ST PNEU REG OUT	S	0	800	PIA	10	SLO	7	01720	1		1223	2	27-16505
A	G	1026	V	PITCH ANALOG	D	M30	30	VDC	0.2	SLO							27-0001-3

VEHICLE

MEASUREMENT NUMBER

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated description of the measurement.

RECORDER ASSIGNMENT

This code defines the method to be utilized to record the measurement. A double letter here indicates that this measurement will be recorded on two different types of recorders.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

UNITS OF FUNCTION

ACCURACY REQUIREMENT

Present in units of the function measured.

FREQUENCY RESPONSE

Denotes the frequency response requirements in cps of the instrumentation system for the measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

TRANSDUCER SERIAL NUMBER

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 8E LANDLINE REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 1

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Number
	D			RANGE SAFETY SYSTEM														
	D	M142	V	RSC #1 BAT DC		M											P	
	D	M143	V	RSC #2 BAT DC		M											P	
	D	M140	W	RSC #1 TOTAL TIMER		M		0	1000	HR							P	
	D	M141	W	RSC #2 TOTAL TIMER		M		0	1000	HR							P	
	D	M15C	W	RSC #1 & 2 BATTERY		M		0	1000	HR							P	
	E			ELECTRICAL POWER SYS														
	E	MC66	C	MISSILE DC AMPS		M		0	200	AMP							P	
	E	M068	C	EMERGENCY GENERATOR		M		0	200	AMP							P	
	E	M005	Q	MISSILE INT PHASE A		M		350	450	CPS		SLO					P	
	E	M029	Q	MISSILE EXT PHASE A		M		350	450	CPS		SLO					P	
	E	M031	Q	PHASE A EXT @ MSL		M		396	404	CPS							P	
	E	M003	V	MISSILE INTERNAL DC		M		0	40	VDC							P	
	E	M006	V	MISSILE INTERNAL AC		M		110	120	VAC							P	
	E	M022	V	MISSILE AC EXT @ MSL		M		110	120	VAC							P	
	E	M023	V	MISSILE EXTERNAL AC		M		110	120	VAC							P	
	E	M030	V	MISSILE DC EXT @ MSL		M		0	40	VDC							P	
	E	M065	V	MISSILE EXTERNAL DC		M		0	40	VDC							P	
	E	M109	W	MAIN MSL BATT TIMER		M											P	
	E	M110	W	INVERTER TIMER		M											P	
	F			PNEUMATIC SYSTEM														
	F	3309	D	LO2 ULLAGE VENT VLV		[illegible]		OPN	CLS			SLO					P	
	F	1001	P	LO2 TANK HELIUM		M		0	50	PIG	1	SLO	27 01243 5	15683	484	3	P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 8E LANDLINE REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 2

1 VEHICLE	2 SYSTEM	3 MEASUREMENT NUMBER	4 TYPE MEASUREMENT	5 DESCRIPTION	6 RECORDER	7 TRACK	8 CHANNEL	9 MEASUREMENT RANGE LOW	9 MEASUREMENT RANGE HIGH	10 UNITS OF FUNCTION	11 ACCURACY	12 RATE OF CHANGE OR FREQUENCY OF FUNCTION	13 TYPE OF TRANSDUCER	14 SERIAL NO.	15 STATION NO.	16 QUADRANT	17 CARD CODE	DRAWING NUMBERS
3	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	72	27-11679
	F	M001	P	LO2 TANK HELIUM		M		0	50	PIG			27 01243 5	15683	484	3	P	27-11679
	F	1003	P	FUEL TANK HELIUM		O		0	75	PIG	1	SLO	27 01243 7	314D	948	3	P	27-11683
	F	M003	P	FUEL TANK HELIUM		M		0	75	PIG			27 01243 7	314D	948	3	P	27-11683
	F	M032	P	LN2 PRESSURE		M		0	4000	PIG							P	
	F	M053	P	NORM SUP PRESSURE		M		0	4000	PIG							P	
	F	M054	P	EMERG SUP PRESSURE		M		0	4000	PIG							P	
	F	M116	D	DIFFERENTIAL PRESS		M		0	5	PID							P	
	F	1145	P	S CTL HE BTL DISCH		S		0	3500	PIA	105	SLO	7 01720 5	5867	1213	2	P	27-11650
	F	M145	P	S CTL HE BTL DISCH		M		0	3500	PIA	105	SLO	7 01720 5	5867	1213	2	P	27-11650
A	F	1194	P	FACILITY GN2 SUPPLY		S		0	2400	PIG	48	SLO					P	
	F	1246	P	B TANK HE BOTTLES HI		S		0	3500	PIG	65	SLO	7 01720 5	4307	1200	4	P	27-11682
	F	M246	P	B TANK HE BOTTLES HI		M		0	4000	PIG			7 01720 5	4307	1200	4	P	27-11682
	F	3301	P	GND LO2 ULLAGE TANK		S		20	30	PIG	.1	SLO					P	
	F	3302	P	GND FUEL ULLAGE TANK		S		55	65	PIG	.1	SLO					P	
A	F	1826	P	AIG POD AIR IN Q-2				0	1	PIG	.05	SLO	27 01377 3				P	
A	F	1828	P	AIG POD AIR IN Q-3				0	1	PIG	.05	SLO	27 01377 3				P	
	F	M247	T	BSTR TANK TEMP		M		M80	M380	DGF			7 01633 5	282	1221	4	P	27-11682
A	F	1827	T	AIG POD AIR IN Q-2				30	60	DGF	2	SLO	87 93900 090				P	
A	F	1829	T	AIG POD AIR IN Q-3				30	60	DGF	2	SLO	87 93900 090				P	
A	F	3831	T	EXHST AREA AMB TEMP				30	60	DGF	2	SLO	T/C				P	
A	F	3832	T	FWD FACE PLATF SKIN				30	60	DGF	2	SLO	T/C				P	
A	F	3833	T	FWD FACE PLATF SKIN				30	60	DGF	2	SLO	T/C				P	
A	F	3834	T	FWD FACE PLATF SKIN				30	60	DGF	2	SLO	T/C				P	
A	F	3835	T	AFT FACE PLATF SKIN				30	60	DGF	2	SLO	T/C				P	
A	F	3836	T	AFT FACE PLAT SKIN				30	60	DGF	2	SLO	T/C				P	
A	F	3837	T	AFT FACE PLATE SKIN				30	60	DGF	2	SLO	T/C				P	
A	F	3838	T	POD AMB TEMP				30	60	DGF	2	SLO	T/C				P	
	I			INERTIAL GUIDANCE														
	I	1515	A	ACCELEROMETER X F1													P	
	I	1516	A	ACCELEROMETER Y F1													P	

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MISSILE: GE LANDLINE REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 3

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
	I	1517	A	ACCELEROMETER Z F1													P	
	I	1518	A	ACCELEROMETER X F2													P	
	I	1519	A	ACCELEROMETER Y F2													P	
	I	1520	A	ACCELEROMETER Z F2													P	
	I	1591	C	PITCH GYRO TORQUE				M75	75	MA							P	
	I	1592	C	ROLL GYRO TORQUE				M75	75	MA							P	
	I	1593	C	YAW GYRO TORQUE				M75	75	MA							P	
	I	1594	D	PENDULUM #1 NULL		D	4	M20	20	MIN							P	
	I	1595	D	PENDULUM #2 NULL		D	5	M20	20	MIN							P	
	I	1596	D	OPTIC SIGNAL		D	6	M7.5	7.5	MIN							P	
	I	1505	H	COMPUTER POSITION X				0	6K	NM		105					P	
	I	1506	H	COMPUTER POSITION Y				M300	500	NM		10K					P	
	I	1507	H	COMPUTER POSITION Z				0	700	NM		10K					P	
	I	1508	H	RANGE ERROR FUNCTION				0	6K	NM		10K					P	
	I	1509	H	AZM ERROR FUNCTION				M300	0500	NM		10K					P	
	I	1502	L	COMPUTER VELOCITY X				0	22K	F/S		10K					P	
	I	1503	L	COMPUTER VELOCITY Y				0	4K	F/S		10K					P	
	I	1504	L	COMPUTER VELOCITY Z				0	6K	F/S		10K					P	
	I	1601	V	400 CPS REFERENCE													P	
B	I	1606	V	COMPUTER RESET		O		0	10	VDC	15%						P	
	I	1510	W	ELAPSED TIME				0	450	SEC							P	
	I	1521	X	VERN ENGINE COF SIG				ON	OFF								P	
	I	1522	X	S ENGINE COF SIG				ON	OFF								P	
	I	1570	X	STAGING SIG													P	
	I	1603	X	WORD GATE FIVE				ON	OFF								P	
	I	1604	X	MULT GATE SIX				ON	OFF								P	

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MISSILE 8E LANDLINE REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 4

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
	I	1605	X	112 CPS GATE				ON	OFF								P	
	M			MISCELLANEOUS														
	M	M144	V	STROBELIGHT BATTERY		M											P	
	M	1090	X	MSL ONE INCH MOTION		R		OFF	ON								P	
	N			FACILITIES AND SITE														
	N	M362	D	36 INCH WATER VALVE		M											P	
	N	1310	P	SLUG CH LO2 DISCH		S		0	500	PIG		SLO					P	
	N	1314	T	SLUG CH LO2 DISCH		S		M250	M325	DGF		SLO					P	
	N	1335	X	SLG CH LO2 DISCH VLV		R		OPEN	CLOS			SLO					P	
8	N	3335	X	SLG CH LO2 DISCH VLV		R		OFF	ON			STP					P	
	N	1336	X	SLG CH LO2 VENT VLV		R		OPEN	CLOS			SLO					P	
8	N	3336	X	SLG CH LO2 VENT VLV		R		OFF	ON			STP					P	
	N	1337	X	SLG CH LO2 INLET VLV		R		OPEN	CLOS			SLO					P	
8	N	3337	X	SLG CH LO2 INLET VLV		R		OFF	ON			STP					P	
	N	1338	X	SLG CH LN2 INLET VLV		R		OPEN	CLOS			SLO					P	
	N	1339	X	SLG CH GN2 INLET VLV		R		OPEN	CLOS			SLO					P	
8	N	3356	X	SLG CH LO2 LOW LEVEL		R		OFF	ON			STP					P	
8	N	3932	X	LO2 TPNG VLV CLOSED		R		OFF	ON			STP					P	
8	N	3933	X	LO2 TPNG VLV OPEN		R		OFF	ON			STP					P	
8	N	1979	X	PRESS VLV CLOSED		R		OFF	ON			STP					P	
	P			PROPULSION SYSTEM														
	P	M242	B	PUMP LC SPEED		M		0	100	PCT							P	
	P	M685	M	FUEL IN MISSILE		M		0	10K	GAL							P	
	P	1010	P	B1 LUBE OIL INJ MAN		S		0	1000	PIA	50	SLO	7 01731 7	5768	1173	1	P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 8E LANDLINE — REPORT NO. AZC-27-059-8 — DATE 31 OCT 60 — PAGE 5

	Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
																			27-11721
		P	1011	P	B2 LUBE OIL INJ MAN		S		0	1000	PIA	50	SLO	7 01731 7	5733	1144	3	P	27-11722
		P	1232	P	S LO2 SEAL CAVITY		S		0	15	PIG	2	SLO	27 01243 5	15316	1235	X	P	27-11720
		P	M373	P	LO2 STORAGE TANK		M		0	50	PIG							P	
A		P	M430	P	FUEL STORAGE TANK		M		0	10	PIG	.6	SLO					P	
		P	1465	P	S LO PR LUBE OIL MAN		S		0	100	PIG		SLO	27 01243 9	0059F	1235	X	P	27-11720
		P	1474	P	V CTL PRESS REG OUT		S		200	800	PIA	16	SLO	7 01731 3	5592	1208	Y	P	27-11651
		P	1020	T	B1 LOX PUMP INLET		S		M325	M275	DGF	1	SLO	7 01649 9				P	
		P	1054	T	B2 LOX PUMP INLET		S		M325	M275	DGF	1	SLO	7 01649 9				P	
		P	1325	T	ENG COMP AMBIENT		S		M100	500	DGF	3	SLO	7 01684 5		1208	Y	P	27-11651
		P	1710	T	SE ENVIRONMENT		S		M100	500	DGF		SLO	7 01684 5		1235	3	P	27-17540
		P	1711	T	B1 NACELLE AMBIENT		S		M100	500	DGF		SLO	7 01684 5	265R	1204	4	P	27-17546
		P	1712	T	B2 NACELLE AMBIENT		S		M100	500	DGF		SLO	7 01684 5	411R	1204	2	P	27-17546
		P	M849	W	LO2 SLUG XFER & FIRE		M											P	
		P	1155	X	OBSERVER CUTOFF		R		OFF	ON	VDC		STP					P	
		P	1161	X	TCC START SWITCH		R		OFF	ON	VDC		STP					P	
		P	1164	X	TCC ENGINE COF SW		R		OFF	ON	VDC		STP					P	
B		P	1225	X	ENGINE CONTROL READY		R		OFF	ON	VDC		STP					P	
B		P	1226	X	PNEUMATICS CUTOFF		R		OFF	ON	VDC		STP					P	
B		P	1227	X	LO2 DOME PURGE		R		OFF	ON	VDC		STP					P	
B		P	1228	X	IGNITER FUEL PURGE		R		OFF	ON	VDC		STP					P	
B		P	1229	X	LO2 HIGH TOPPING		R		OFF	ON	VDC		STP					P	
B		P	1230	X	LO2 LOW TOPPING		R		OFF	ON	VDC		STP					P	
B		P	1231	X	LO2 100% SLUG COM		R		OFF	ON	VDC		STP					P	
		P	1547	X	S CUTOFF RELAY		R		OFF	ON	VDC		STP					P	
		P	1544	X	VERNIER CONTROL		R		OFF	ON	VDC		STP					P	
		P	1545	X	S IGN STAGE CONTROL		R		OFF	ON	VDC		STP					P	
		P	1546	X	B2 CUTOFF RELAY		R		OFF	ON	VDC		STP					P	
		P	1547	X	B1 CUTOFF RELAY		R		OFF	ON	VDC		STP					P	
		P	1548	X	COMPLETE COF RELAY		R		OFF	ON	VDC		STP					P	
		P	1549	X	IGNITION START		R		OFF	ON	VDC		STP					P	

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MISSILE INSTRUMENTATION LOG SHEET

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	Vehicle (1)	System (2)	Measurement Number (3)	Type Measurement (4)	Description (5)	Recorder (6)	Track (7)	Channel (8)	Measurement Range Low (9)	Measurement Range High (9)	Units of Function (10)	Accuracy (11)	Rate of Change or Frequency of Function (12)	Type of Transducer (13)	Serial No. (14)	Station No. (15)	Quadrant (16)	Card Code (17)	Drawing Numbers
A		P	1785	X	B SECONDARY SHUTDOWN	R			OFF	ON	VDC		STP					P	
		S			AUTOPILOT SYSTEM														
B		S	M358	O	ROLL PROGRAM READOUT	M												P	
		S	1048	V	PROGRAMMER PITCH SIG	D			0	2.7	VAC	.2	SLO					P	
		S	1049	V	PROGRAMMER ROLL SIG	D			0	60	VAC	3	STP					P	
		S	1107	V	B1 PCH ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	
		S	1108	V	B2 PCH ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	
		S	1113	V	V1 YAW ACTR FEEDBACK	D			M5	7	VAC	5%	30					P	
		S	1114	V	V2 YAW ACTR FEEDBACK	D			M5	7	VAC	5%	30					P	
		S	1118	V	V2 ROL ACTR FEEDBACK	D			M11	11	VAC	5%	30					P	
		S	1119	V	V1 ROL ACTR FEEDBACK	D			M11	11	VAC	5%	30					P	
		S	1121	V	GYRO TEST SIG	D			M5	5	VAC	.1	STP					P	
		S	1122	V	SERVO TEST SIGNAL	D			M11	11	VAC	5%	30					P	
		S	1128	V	B1 YAW ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	
		S	1129	V	B2 YAW ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	
		S	1147	V	PITCH GYRO AMP OUT	D			M10	10	VAC	1	30					P	
		S	1148	V	YAW GYRO AMP OUT	D			M10	10	VAC	1	30					P	
		S	1149	V	ROLL GYRO AMP OUT	D			M10	10	VAC	1	30					P	
		S	1216	V	S PCH ACTR FEEDBACK	D			M10	10	VAC	5%	30					P	
		S	1217	V	S YAW ACTR FEEDBACK	D			M10	10	VAC	5%	30					P	
		S	M270	V	FINE HEATER-PITCH	M			0	150	VAC							P	
		S	M271	V	FINE HEATER-YAW	M			0	150	VAC							P	
		S	M272	V	FINE HEATER-ROLL	M			0	150	VAC							P	
		S	M176	W	PROGRAM RUN TIME	M			0	999	SEC							P	
		S	M282	W	DECADE EVENT TIMER	M			0	10K	SEC							P	
		S	1235	X	PROGRAMMER RUN TIME	R			OFF	ON	VDC		STP					P	
		S	1370	X	STAGING	R			OFF	ON	VDC		STP					P	
		S	1371	X	BOOSTER JETTISON	R			OFF	ON	VDC		STP					P	

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MISSILE INSTRUMENTATION LOG SHEET

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
B	S	1372	X	PRESSURIZE VERN TANK		R		OFF	ON	VDC		STP					P	
B	S	1373	X	BOOSTER CUTOFF		R		OFF	ON	VDC		STP					P	
B	S	1374	X	SUSTAINER CUTOFF		R		OFF	ON	VDC		STP					P	
B	S	1375	X	VSHPS BACK-UP SIGNAL		R		OFF	ON	VDC		STP					P	
B	S	1376	X	VERNIER CUTOFF		R		OFF	ON	VDC		STP					P	
B	S	1377	X	EJECT RV UMBILICAL		R		OFF	ON	VDC		STP					P	
B	S	1378	X	RV JETTISON		R		OFF	ON	VDC		STP					P	
B	S	1379	X	FIRE RETRO ROCKETS		R		OFF	ON	VDC		STP					P	
	T			TELEMETERING SYSTEM														
B	T	M140	V	TLM #1 BAT DC		M											P	
B	T	M141	V	TLM #1 EXTERNAL DC		M											P	
B	T	M144	V	TLM #2 BAT DC		M											P	
B	T	M145	V	TLM #2 EXTERNAL DC		M											P	
B	T	M146	V	TLM #3 BAT DC		M											P	
B	T	M147	V	TLM #3 EXTERNAL DC		M											P	
	T	M156	V	TLM 1-FIL INT DC		M											P	
	T	M157	V	TLM 1-FIL EXT DC		M											P	
	T	M158	V	TLM 2-FIL INT DC		M											P	
	T	M159	V	TLM 2-FIL EXT DC		M											P	
	T	M160	V	TLM 3-FIL INT DC		M											P	
	T	M161	V	TLM 3-FIL EXT DC		M											P	
	T	M150	W	TLM #1 TOTAL		M		0	1000	HR							P	
	T	M151	W	TLM #2 TOTAL		M		0	1000	HR							P	
	T	M152	W	TLM #3 TOTAL		M		0	1000	HR							P	
B	T	M153	W	TLM #1 BAT TIMER		M											P	
B	T	M154	W	TLM #2 BAT TIMER		M											P	
	T	M155	W	TLM #1 BATTERY		M		0	60	MIN							P	
	U			PROPELLANT UTILIZ														
	U	1091	V	ERROR RATIO DEMOD OP		S		M20	20	VDC	.5	20					P	

REPORT NO. AZC-27-059-8 [redacted]

SECTION 10

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 9E LANDLINE REPORT NO. AZC-27-059-8 DATE 31 OCT 60 PAGE 9

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
U		1200	X	LO2 100% SLUG COF-1		R		OFF	C	VDC		STP					P	
U		1201	X	LO2 TOPG HI CTL-1		R		OFF	ON	VDC		STP					P	
U		1202	X	LO2 TOPG LO CTL-1		R		OFF	ON	VDC		STP					P	
U		1203	X	LO2 95% RAPID LOAD-1		R		OFF	ON	VDC		STP					P	
U		1204	X	FUEL 100% SEC CTL		R		OFF	ON	VDC		STP					P	
U		1205	X	FUEL 100% PRI CTL		R		OFF	ON	VDC		STP					P	
U		1206	X	FUEL 95% SEC CTL		R		OFF	ON	VDC		STP					P	
U		1207	X	FUEL 95% PRI CTL		R		OFF	ON	VDC		STP					P	
U		1208	X	LOX 100% SLUG COF-2		R		OFF	ON	VDC		STP					P	
U		1209	X	LOX TOPG HI CTL-2		R		OFF	ON	VDC		STP					P	
U		1210	X	LOX TOPG LO CTL-2		R		OFF	ON	VDC		STP					P	
U		1211	X	LOX 95% RAPID LOAD-2		R		OFF	ON	VDC		STP					P	

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DATE 26 May 1960
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CONVAIR (ASTRONAUTICS) DIVISION
GENERAL DYNAMICS CORPORATION

WS-107A-1

INSTRUMENTATION CONFIGURATION

SERIES E ARTICLE 9

AMR

PREPARED BY TEST PLANNING

CO-ORDINATED BY W S Becker
W. S. Becker

APPROVED BY HR Macdonald
H. R. Macdonald
Test Planning

CHECKED BY T M Wooster
T. M. Wooster
Instrumentation

APPROVED BY
P. [illegible]. Lynch
Chief - Field Test
Engineering

GD
GENERAL DYNAMICS

[redacted]

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
A	7 Dec. 60	WSB	ADDITIONS:	ALL TABS
			F3309D, F1194P, F3301P, F3302P,	
			G302C, G94O, G197O, G587O, G588P,	
			G589P, G281V, I1606V, N3335X,	
			N3336X, N3337X, N3356X, N3932X,	
			N3933X, N1979X, P1020T, P1054T,	
			P709T, P713T, P714T, P1225X, P1226X,	
			P1227X, P1228X, P1229X, P1230X,	
			P1231X, P1785X, S1370X, S1371X,	
			S1372X, S1373X, S1374X, S1375X,	
			S1376X, S1377X, S1378X, S1379X.	
			Reasons for revision "A" changes	4-1
A	7 Dec. 60	WSB	DELETIONS:	
			F34P, F65P, F147P, F212P, FM248P,	
			F17T, F146T, I560O, I561O, I564O,	
			I565O, I566O, P1528D, P17T, P18T,	
			P326T, P1017T, P1018T, P1326T,	
			I5620	
			R B W[illegible] HKM for PJL	

FOREWORD

This report has been published in accordance with contractual requirements as cited in Convair-Astronautics Report ZM-7-289. It describes the instrumentation released for Missile 9-E as of 7 December 1960. A

Information presented here will be used by Air Force, Associate Contractors, Design, Operation, and Field Test Groups. Measurement modification will either originate in the Instrumentation Planning Group or will be submitted as a recommendation to this group.

TABLE OF CONTENTS

A

A

SUMMARY

The instrumentation configuration for this missile has been established through a study of program test objectives, systems analysis, and operating considerations. A discussion of missile instrumentation and associated characteristics has been summarized in Report AZC-27-059. For a detailed description of the various missile systems, test objectives, and general test program see Report AZC-27-045.

The specific measurements to be transmitted via telemeter have been tabulated and are listed in Sections 8 and 9 in terms of instrumentation systems and telemeter channel assignments.

In addition to the telemetry, the landline instrumentation program for this missile has been included in this report in the form of a master tabulation of landline measurement characteristics, (Section 10).

To clarify specific measurements, instrumentation location schematics have been included in Report AZC-27-059, Section 7.

REASONS FOR REVISION "A" CHANGES

I. The following measurements will be used to determine the cause of impact-predictor dropout experienced on the GE-IP system on "D" AIG flights.

MEAS. NO.	DESCRIPTION	CHANNEL
ADD		
G302C	PB-IP MODULATOR AIG	1.11.53
G94O	BOOM ANTENNA	1.C.17, 31
G197O	RB-IP RADIAL	1.C.1, 15
G587O	POD WAVEGUIDE	1.C.33, 47
G588P	WAVE GUIDE PRESSURE 1	1.12.7
G589P	WAVE GUIDE PRESSURE 2	1.12.9
G281V	RB REFLECT SET	1.11.49
DELETE		
I560O	BINNACLE X AXIS	
I561O	BINNACLE Y AXIS	
I562O	BINNACLE Z AXIS	
I564O	COMPUTER X AXIS	
I565O	COMPUTER Y AXIS	
I566O	COMPUTER Z AXIS	

II. The presence of the helium flow measuring orifices in the missile tank pressurization lines interferes with the operation of airborne pneumatic regulators. This phenomena was discovered during 3E FRF.

DELETE	
F34P	FUEL PRESS ORIFIC DP
F65P	LO_2 TK HE LIN @ORFC
F147P	LO_2 PRESS ORFC DP
F212P	FUEL PRESS ORIFIC IN
F146T	LO_2 PRESS ORFC IN
F17T	FUEL PRESS ORIFIC IN

III. There is no sustainer LO tank pressurization bottle on series E missiles, therefore the following measurement has been deleted.

MEAS. NO.	DESCRIPTION	CHANNEL
DELETE		
FM248P	S TANK HE BOTTLE HI	

IV. The following landline measurement provides useful data only during an FRF. Since 9E will not be FRF'D, the measurement has been deleted.

DELETE		
P1528D	SUS FUEL VALVE POS	

V. These measurements have been added to determine if proper sequencing of LO_2 slug transfer valves is occurring.

ADD		
N3335X	SLG CHG LOX DISCH VLV	
N3336X	SLG CHG LOX VENT VLV	
N3337X	SLG CHG LOX INLET VLV	
N3356X	SLG CHG LOX LO LEVEL	
N3932X	LOX TPNG VLV CLOSED	
N3933X	LOX TPNG VLV OPEN	
N1979X	PRESS VLV CLOSED	

VI. The following measurements were added to provide a record for proof of proper sequence operation of data for failure analysis. These measurements will be made during the integrated systems tests of the autopilot programmer.

ADD		
S1370X	STAGING	
S1371X	BOOSTER JETTISON	

MEAS. NO.	DESCRIPTION	CHANNEL
ADD		
S1372X	PRESSURIZE VERN TANK	
S1373X	BOOSTER CUTOFF	
S1374X	SUSTAINER CUTOFF	
S1375X	VSHPS BACK-UP SIGNAL	
S1376X	VERNIER CUTOFF	
S1377X	EJECT RV UMBILICAL	
S1378X	RV JETTISON	
S1379X	FIRE RETROROCKETS	

VII. The following measurement is added to ascertain the adequacy of the GN_2 supply during countdown and holds.

ADD		
F1194P	FACILITY GN_2 SUPPLY	

VIII. The following sequence measurements will be used for flight test and systems validation, by providing time-sequence of operation of these functions during ground checkout.

ADD		
P1225X	ENGINE CONTROL READY	
P1226X	PNEUMATICS CUTOFF	
P1227X	LOX DOME PURGE	
P1228X	IGNITER FUEL PURGE	
P1229X	LOX HIGH TOPPING	
P1230X	LOX LOW TOPPING	
P1231X	LOX 100% SLUG COM	

IX. The booster lox pump inlet temperature measurements have been added as operational redlines.

MEAS. NO.	DESCRIPTION	CHANNEL
ADD		
P1054T	B2 LOX PUMP INLET	
P1020T	B1 LOX PUMP INLET	

X. This measurement will indicate the number of guidance computer off-on cycles and help to establish the computer run time when combined with measurement I1510W.

ADD		
11606V	COMPUTER RESET	

XI. The following measurement has been added to validate the booster secondary shutdown system timer.

ADD		
P1785X	B SECONDARY SHUTDOWN	

XII. Thermocouples installed at the turbine inlets at 1-4E burned off during the first half second of firing. The reliability of the gas generator combustor temperature measurements is much greater and has been demonstrated.

ADD		
P709T	SGG COMBUSTOR	3.11.9
P713T	B1 GAS GEN COMBUSTOR	3.11.5
P714T	B2 GAS GEN COMBUSTOR	3.11.7

MEAS. NO.	DESCRIPTION	CHANNEL
DELETE		
P17T	B2 TURBINE INLET	
P18T	B1 TURBINE INLET	
P326T	S TURBINE INLET	
P1017T	B2 TURBINE INLET	
P1018T	B1 TURBINE INLET	
P1326T	S TURBINE INLET	

SECTION 8

MISSILE INSTRUMENTATION BY SYSTEM

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by system.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

UNITS OF FUNCTION

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

A	F	1	P	LO_2 TANK HELIUM	1	11	35	0	45	PIA	SLO	7 01723 11		480	2		P	27-11608
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA	SLO	7 01723 13		925	Y		F	27-11609
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA	SLO	7 01731 3		1243	4		F	27-16500
A	F	260	P	B TANK HE BOTTLES LO	1	11	17	15	415	PIA	SLO	7 01727 1		1238	1		P	27-11600
A	F	261	P	S TANK HE BOTTLE LO	1	11	21	15	415	PIA	SLO	7 01727 1		1223	2		F	27-16505

MEASUREMENT NUMBER

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number assignment for the applicable measurement.

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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MISSILE INSTRUMENTATION LOG SHEET

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
	A			AIRFRAME														
	A	285	I	THRUST SECT LITE B1	3	11	1	0	600	FTC			7 01709 1		1220	4	P	27-11733
	A	744	I	THRUST SECT LITE B2	3	11	3	0	600	FTC			7 01709 1		1220	2	P	27-11733
B	A	488	T	AMB F STG VLV Q3	1	11	15	M100	300	DGF		SLO	27 01287 3	23346	1173	3	P	27-11793
B	A	638	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3	21273	1220	2	P	27-11793
	A	639	T	AMB JET RAIL Q4	1	11	45	M100	300	DGF		SLO	27 01287 3	23918	1178	4	P	27-11793
B	A	640	T	FWD SIDE A FRAME Q4	1	11	31	M100	300	DGF		SLO	27 01287 3	23919	1205	4	P	27-11793
B	A	641	T	AMB F STG VLV Q1	1	11	37	M100	300	DGF		SLO	27 01287 3	23345	1174	1	P	27-11793
	A	642	T	AMB NEAR B2 GG Q3	1	11	41	M100	300	DGF		SLO	27 01287 3	50209	1196	3	P	27-11794
B	A	645	T	AMB FWD B1 Q4	1	11	33	M100	300	DGF		SLO	27 01287 3	50219	1196	2	P	27-11794
	D			RANGE SAFETY SYSTEM														
	D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC		STP					P	
	D	1	V	RSC CUTOFF OUTPUT	1	6	S	0	31	VDC		BLP					M	
	D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	100K	UV		SLO		124			P	
	D	3	X	RSC DESTRUCT OUTPUT	2	E	95	0	30	VDC		STP					P	
	E			ELECTRICAL POWER SYS														
B	E	50	Q	40. CYCLE AC PWRSUP	1	1		370	430	CPS		SLO					P	
	E	28	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC		SLO		0004			P	
	E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC		SLO		0004			P	
	E	53	V	400 CYCLE AC PHASE C	1	13	23	103	125	VAC		SLO		0004			P	
	F			PNEUMATIC SYSTEM														
	F	1	P	LO2 TANK HELIUM	1	13	33	0	45	PIA		SLO	7 01723 11	4192	484	3	P	27-11679
	F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA		SLO	7 01723 13	5263	948	3	P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 9-E RSPC NO. AZC-27-059-9 DATE 07 DEC 60 PAGE 2

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Subcarrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
																		27-11683
	F	114	P	LO2 PRESS REG INLET	1	13	45	0	3000	PIA		SLO	7 01731 9	6834	1187	4	P	27-11682
	F	145	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA		SLO	7 01720 5	4216	1213	2	P	27-11650
	F	246	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA		SLO	7 01720 5	5634	1187	4	P	27-11682
	F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01684 3	R166	1205	4	P	27-11682
	F	247	T	B TANK HE BOTTLES	1	11	35	M400	M350	DGF		SLO	7 01633 5	90L	1221	4	P	27-11682
	G			RADIO GUIDANCE SYS														
	G	302	C	PB-IP MODULATOR AVG	1	11	53	M1.7	0	VDC		SLO					P	
	G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA		SLO					P	
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E		SLO					P	
	G	94	O	BOOM ANTENNA	1	C	17			G		1K					P	
	G	197	O	RB-IP RADIAL	1	C	1			G		1K					P	
	G	587	O	POD WAVEGUIDE	1	C	33			G		1K					P	
	G	588	P	WAVE GUIDE PRESS 1	1	12	7	0	15	PIA		SLO	7 01225 1				P	
	G	589	P	WAVEGUIDE PRESS 2	1	12	9	0	15	PIA		SLO	7 01225 1				P	
	G	281	V	RB REFLECT SET	1	11	49	M2.5	0	VDC		SLO					P	
	G	503	V	MOD III PB AGC	1	11	17	0	M4.8	VDC		SLO					P	
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
	H			HYDRAULIC SYSTEM														
	H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA		SLO	7 01731 9	5148	1173	1	P	27-11721
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA		SLO	7 01720 5	5089	1213	2	P	27-11650
	H	219	P	S TK RESVR GAS	2	11	41	0	200	PIG		SLO	27 01243 7	7009	1206	1	P	27-11651
	H	224	P	B HYD SYS LO PRESS	2	11	39	0	200	PIG		SLO	27 01243 11	15297	1175	4	P	27-11815
	H	225	P	B TK RESVR GAS	1	A	3	0	200	PIG		SLO	27 01243 7	15916	1174	4	P	27-[illegible]15
	H	315	P	SUS HYD LO PRESS	1	A	21	0	200	PIG		SLO	27 01243 11	15394	1200	3	7	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
																		27-17570
B	H	227	X	S TK RESVR PISTON	1	A	15	ON	OFF				87 44900 109		1160	4	P	27-85209
	I			INERTIAL GUIDANCE														
@	I	513	A	ACCEL XF1 DIRECT	3	C				G							P	
@	I	514	A	ACCEL XF2 DIRECT	3	E				G							P	
@	I	516	A	ACCELEROMETER YF1	2	A				G							P	
@	I	517	A	ACCELEROMETER ZF1	3	13				G							P	
@	I	519	A	ACCELEROMETER YF2	2	C				G							P	
@	I	520	A	ACCELEROMETER ZF2	3	A				G							P	
@	I	549	D	PITCH SERVO ERROR	2	6		M4.6	4.1	MIN		20					P	
	I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20					M	
@	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	DEG		100					P	
@	I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
@	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
@	I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100					M	
	I	552	D	REDNDT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35					P	
@	I	552	D	REDNDT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
@	I	505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
@	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
@	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
@	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	
@	I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
@	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
@	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
@	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
	I	572	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
@	I	531	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR POS. NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS (IN FUNCTION)	ACCURACY	RATE OF CHANGE FREQUENCY OR FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.		CARD CODE	DRAWING NUMBERS
●	I	532	T	GYRO 2	1	12	9	M6.3	6.3	DGC		SLO					P	
	I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
	I	534	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
	I	535	T	COMPUTER	1	12	19	0	50	DGC		SLO					P	
●	I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	
●	I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10					M	
●	I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
●	I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6					M	
	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
●	I	540	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		SLO					P	
	I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
	I	543	V	COMPUTER M50 PSUP	3	9		M55	0	VDC		SLO					P	
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
	I	545	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
	I	547	V	COMPUTER 4 PSUP	1	13	43	0	6	VDC		SLO					P	
	I	548	V	COMPUTER 38 PSUP	1	12	41	0	42	VDC		SLO					P	
●	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	A
●	I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
●	I	910	W	ELAPSED TIME	1	E	D	0	490	SEC		10K					P	
●	I	9P	W	TIME T	2	8	S					BLP					P	
	I	921	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	921	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP					P	
	I	922	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	922	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP					P	
●	I	923	X	26V COF RELAYS	2	10	S	OFF	ON			BLP					P	
●	I	925	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
●	I	926	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
●	I	927	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
●	I	937	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
●	1	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	M			MISCELLANEOUS														
	M	143	D	BOOSTER SEPARATION	3	7		0	8	IN		14	7 01676 1	LU138	1131	1	P	27-11723
	M	32	X	CONAX VALVE COMMAND	1	A	23	OFF	ON			STP					P	
	M	78	X	STROBE LIGHT OCCUR	1	C	95	OFF	ON	VDC		STP					P	
B	M	84	X	B STGG LATCH MSW Q1	3	8		OFF	ON				87 44900 109		1145	1	P	27-11797
B	M	85	X	B STGG LATCH MSW Q2	3	8		OFF	ON				87 44900 109		1145	1	P	27-11797
B	M	86	X	B STGG LATCH MSW Q3	3	8		OFF	ON				87 44900 109		1145	1	P	27-11797
B	M	87	X	B STGG LATCH MSW Q4	3	8		OFF	ON				87 44900 109		1145	1	P	27-11797
	P			PROPULSION SYSTEM														
B	P	798	A	LO2 LINE AXIAL ACCEL	2	12		M60	60	G		100	27 01277 5	500	1111	1	P	27-[illegible]
B	P	799	A	LO2 LINE LAT ACCEL	2	13		M60	60	G		100	27 01277 5	512	1111	1	P	
●	P	83	B	B2 PUMP SPEED	1	2		5680	6400	RPM		SLO	27 01267 1	16	1198	2	P	27-11722
●	P	84	B	B1 PUMP SPEED	2	2		5680	6400	RPM		SLO	27 01267 1	26	1198	4	P	27-11721
●	P	349	B	S PUMP SPEED	1	3		9.9	11.2	KPM		SLO	27 01264 5	46N	1294	3	P	27-13720
	P	528	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG		SLO	NAA				P	
	P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG		SLO	NAA		1205	3	P	27-17564
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA		150	7 01731 5	6621	1295	1	P	27-11720
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA		SLO	7 01720 3	1560R	1208	1	P	27-[illegible]681
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA		SLO	7 01737 3	[illegible]	1127	4	P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA		SLO	7 01737 3	1967	1127	2	P	27-11699
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA		SLO	7 01720 3	3544	1208	1	P	27-11681
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA		15	7 01731 5	6996B	1144	3	P	27-117[illegible]2
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	P91		15	7 01731 5	6039	1173	1	P	27-11721
	P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA		SLO	27 01243 9	0045F	1295	1	P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
																		27-11720
	F	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA		15	7 01731 1	6282	1244	2	P	27-11684
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA		15	7 01731 1	6149	1244	1	P	27-11684
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA		SLC	7 0173? 5	W 9	1244	1	P	27-11684
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA		SLO	7 01731 5	6199	1244	2	P	27-11684
	P	155	P	B1 GAS GEN COMBUSTON	1	12	23	0	1000	PIA		SLO	7 01731 5	6033	1173	1	P	27-11721
B	P	184	P	B2 GAS GEN COMBUSTON	1	12	33	0	1000	PIA		SLO	7 01731 5	6470	1144	3	P	27-11722
B	P	185	P	B1 TURBOPUMP GEARBOX	2	11	49	0	15	PIG		SLO	27 01243 5	16087	1173	1	P	27-11721
B	P	188	P	B2 TURBOPUMP GEARBOX	2	11	51	0	15	PIG		SLO	27 01243 5	15795	1144	3	P	27-11722
B	P	279	P	B2 LO2 PR LUB OIL MN	2	11	43	0	125	PIA		SLO	27 01243 9	0041F	1144	3	P	27-11722
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA		15	7 01731 7	4297	1235	1	P	27-11720
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA		SLO	7 01731 5	6562	1235	1	P	27-11720
B	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA		SLO	7 01731 7	7025	1235	1	P	27-11720
	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA		SLO	7 01731 5	6623	1235	1	P	27-11720
B	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIG		SLO	27 01243 9	0051	1173	1	P	27-11721
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	550	1197	3	P	27-11720
B	P	671	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	27 01287 3	23916	1222	4	P	27-11793
	P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 01247 3	94L	1234	4	P	27-11720
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247 3	89L	1210	1	P	27-11721
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247 3	4CL	1210	3	P	27-11722
	P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	P	547	X	B1 CUTOFF RELAY	1	7	S	0	28	VDC		STP					P	
	P	548	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP					P	
	S			AUTOPILOT SYSTEM														
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG		5		0015			P	
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG		5		0015			P	
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG		5		0015			P	
	S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG		10	7 01680 7	744	1212	1	P	
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG		30	7 01680 7	744	1212	Y	M	27-11721
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG		10	7 01680 7	764	1212	2	P	

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	Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Number
		S	205	D	B1 YAW	1	6		M5	5	DEG		10	7 01680 7	740	1212	4	P	27-11722
		S	205	D	B1 YAW	2	11	5	M5	5	DEG		30	7 01680 7	740	1212	4	M	27-11721
		S	206	D	B2 YAW	2	E	19	M5	5	DEG		10	7 01680 7	946	1212	2	P	27-11722
		S	222	D	V1 PITCH	2	E	7	0	50	DEG		10	7 01414 1	07683	1123	4	P	27-11699
		S	223	D	V2 PITCH	2	E	5	0	50	DEG		10	7 01414 1	10372	1123	2	P	27-11699
8		S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG		10	27 01205 1	300H	1129	4	P	27-11699
		S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG		10	27 01205 1	338H	1129	2	P	27-11699
		S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG		6	7 01680 9	769	1210	1	P	
		S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG		30	7 01680 9	769	1210	Y	M	27-11720
		S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG		6	7 01680 3	1159	1210	2	P	
		S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG		30	7 01680 3	1159B	1210	X	M	27-11720
		S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S		15		0015			P	
		S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S		15		0015			M	
		S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S		15		0015			P	
		S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S		15		0015			M	
		S	54	R	YAW RATE GYRO SIG	1	8		M6	6	D/S		15		0015			P	
		S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S		15		0015			M	
		S	246	X	A/P PG SWITCH 17	1	13	3	OFF	ON	VDC		STP					P	
		U			PROPELLANT UTILIZ														
		U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID		SLO	27 01280 1	1994P	948	3	P	27-11683
		U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01280 1	1995P	948	3	P	27-11683
		U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC		SLO		0004			P	
		Y			PAYLOAD														
		Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
		Z			AZUSA														
		Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM		3		211			P	

SECTION 9

MISSILE INSTRUMENTATION BY CHANNEL

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by channel.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

UNITS OF FUNCTION

A	P	29	P	V2 THRUST CHAMBER	1	11	5	0	400	PIA		SLO	7	01737	1		1128	2		P	27-11614
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA		SLO	7	01731	3		1243	4		P	27-16500
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA		SLO	7	01723	13		925	Y		P	27-11609
A	P	671	T	TH SECT AMB QUAD 4	1	11	11	100	700	DGF		SLO	7	01684	9		1230	4		P	27-11599

MEASUREMENT NUMBER

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number for the applicable measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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SECTION 9

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	Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Channel No.	Card Code	Drawing Numbers
					COMM. RATE-CONT.	1	0	0											
B		E	50	Q	400 CYCLE AC PWRSUP	1	1		370	430	CPS		SLO					P	
	●	P	83	B	B2 PUMP SPEED	1	2		5680	6400	RPM		SLO	27 01267 1	16	1198	2	P	27-11722
	●	P	349	B	S PUMP SPEED	1	3		9.9	11.2	KPM		SLO	27 01264 5	46N	1234	3	P	27-11720
		S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG		6	7 01680 9	769	1210	1	P	27-11720
		S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG		6	7 01680 3	1199	1210	2	P	27-11720
		S	205	D	B1 YAW	1	6		M5	5	DEG		10	7 01680 7	740	1212	4	P	27-11721
		D	1	V	RSC CUTOFF OUTPUT	1	6	S	0	31	VDC		BLP					M	
		S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG		10	7 01680 7	746	1212	1	P	27-11721
		P	547	X	B1 CUTOFF RELAY	1	7	S	0	28	VDC		STP					P	
		S	54	R	YAW RATE GYRO SIG	[illegible]	8		M6	6	D/S		15		0015			P	
		S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S		15		0015			P	
		S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S		15		0015			M	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemetry No.	Subcarrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
				COMM. RATE 2.5 RPS	1	11	0											
					1	11	1											
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E		SLO					P	
	F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01684 3	R146	1205	4	P	27-11682
	G	504	C	MOD III MAGNETRON	1	11	7	0	C.9	MA		SLO					P	
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	550	1197	3	P	27-11720
					1	11	11											
B	A	638	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3	21273	1220	2	P	27-11793
B	A	486	T	AMB F STG VLV Q3	1	11	15	M100	300	DGF		SLO	27 01287 3	23346	1173	3	P	27-11793
	G	503	V	MOD III PB AGC	1	11	17	0	M4.8	VDC		SLO					P	
					1	11	19											
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
					1	11	23											
				100% CALIB	1	11	25											
				0% CALIB	1	11	27											
				0% CALIB	1	11	29											
B	A	640	T	FWD SIDE A FRAME Q4	1	11	31	M100	300	DGF		SLO	27 01287 3	23919	1205	4	P	27-11793
B	A	645	T	AMB FWD B1 Q4	1	11	33	M100	300	DGF		SLO	27 01237 3	50219	1196	2	P	27-11794
	F	247	T	E TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01633 5	80L	1221	4	P	27-11682
B	A	641	T	AMB F STG VLV Q1	1	11	37	M100	300	DGF		SLO	27 01287 3	23345	1174	1	P	27-11793
B	P	671	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	27 01287 3	23916	1222	4	P	27-11793
	A	642	T	AMB NEAR B2 GG Q3	1	11	41	M100	300	DGF		SLO	27 01267 3	50209	1196	3	P	27-11794
					1	11	43											
	A	639	T	AMB JET RAIL Q4	1	11	45	M100	300	DGF		SLO	27 01287 3	239[illegible]8	1178	4	P	27-11793
	G	503	V	CONNECTED TO 1 11 17	1	11	47											
B	G	281	V	RB REFLECT SET	1	11	49	M2.5	0	VDC		SLO					P	
	G	579	V	CONNECTED TO 1 11 21	1	11	51											
B	G	302	C	PB-IP MODULATOR AVG	1	11	53	M1.7	0	VDC		SLO					P	
				SYNC & 100% CALIB	1	11	55											
				CONNECTED TO 1 11 55	1	11	56											
				CONNECTED TO 1 11 56	1	11	57											
				CONNECTED TO 1 11 57	1	11	58											
				CONNECTED TO 1 11 58	1	11	59											

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Diagram	Card Code	Drawing Numbers
				COMM. RATE 5 RPS	1	12	0											
●	I	591	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	
●	I	592	T	GYRO 2	1	12	3	M6.3	6.3	DGC		SLO					P	
	I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
B	G	588	P	WAVE GUIDE PRESS 1	1	12	7	0	15	PIA		SLO	7 01225 1				P	
B	G	589	P	WAVEGUIDE PRESS 2	1	12	9	0	15	PIA		SLO	7 01225 1				P	
●	I	540	V	CONTROL 118 PHASE B	1	12	11	0	130	VDC		SLO					P	
	I	534	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
	I	572	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
	F	145	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA		SLO	7 01720 5	4314	1213	2	P	27-11650
	I	593	T	COMPUTER	1	12	19	0	50	DGC		SLO					P	
	I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
	P	155	P	B1 GAS GEN COMBUSTON	1	12	23	0	1000	PIA		SLO	7 01731 5	6053	1173	1	P	27-11721
				100% CALIB	1	12	25											
				0% CALIB	1	12	27											
				50% CALIB	1	12	29											
					1	12	31											
B	P	184	P	B2 GAS GEN COMBUSTON	1	12	33	0	1000	PIA		SLO	7 01731 5	6470	1144	3	P	27-11722
●	I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
	P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG		SLO	NAA		1205	3	P	27-17564
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
	I	548	V	COMPUTER 38 PSUP	1	12	41	0	42	VDC		SLO					P	
	H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA		SLO	7 01731 9	5143	1173	1	P	27-11721
●	I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
●	I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
●	I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA		SLO	7 01720 5	5089	1213	2	P	27-11650
	P	246	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA		SLO	7 01720 5	5634	1187	4	P	27-11682
				SYNC & 100% CALIB	1	12	55											
				CONNECTED TO 1 12 55	1	12	56											
				CONNECTED TO 1 12 56	1	12	57											
				CONNECTED TO 1 12 57	1	12	58											
				CONNECTED TO 1 12 58	1	12	59											

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				DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OF FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBER
				COMM. RATE 5 RPS	1	13	0											
					1	13	1											
	S	248	X	A/P PG SWITCH 17	1	13	3	OFF	ON	VDC		STP					P	
	P	548	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP					P	
	D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC		STP					P	
	P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	E	28	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC		SLO		0004			P	
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA		SLO	7 01720 3	3544	1208	1	P	27-11651
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA		SLO	7 01731 5	6199	1244	2	P	27-11684
	P	96	P	S LO2 PUMP INLET	1	13	17	0	150	PIA		SLO	27 01243 9	0045F	1235	1	P	27-11720
					1	13	19											
	U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01280 1	1995P	948	3	P	27-11683
	E	53	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC		SLO		0004			P	
				100% CALIB	1	13	25											
				0% CALIB	1	13	27											
				50% CALIB	1	13	29											
	U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID		SLO	27 01280 1	1994P	948	3	P	27-11683
	F	1	P	LO2 TANK HELIUM	1	13	33	0	45	PIA		SLO	7 01723 11	4192	484	3	P	27-11679
					1	13	35											
	F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA		SLO	7 01723 13	5263	948	3	P	27-11683
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA		SLO	7 01731 5	W 9	1244	1	P	27-11684
	I	545	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
	I	547	V	COMPUTER 4 PSUP	1	13	43	0	6	VDC		SLO					P	
	F	114	P	LO2 PRESS REG INLET	1	13	45	0	3000	PIA		SLO	7 01731 9	6834	1187	4	P	27-11682
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA		SLO	7 01720 3	1560R	1200	1	P	27-11651
	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA		SLO	7 01731 5	6623	1235	1	P	27-11720
					1	13	51											
	E	53	V	CONNECTED TO 1 13 23	1	13	53											
				SYNC & 100% CALIB	1	13	55											
				CONNECTED TO 1 13 55	1	13	56											
				CONNECTED TO 1 13 56	1	13	57											
				CONNECTED TO 1 13 57	1	13	58											
				CONNECTED TO 1 13 58	1	13	59											

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Cable Code	Drawing Numbers
				COMM. RATE 10 RPS	1	A	0											
	E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC		SLO		0004			P	
B	H	225	P	B TK RESVR GAS.	1	A	3	0	200	PIG		SLO	27 01243 7	15916	1174	4	P	27-11815
	D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	100K	UV		SLO		124			P	
	U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC		SLO		0004			P	
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG		5		0015			P	
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG		5		0015			P	
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG		5		0015			P	
B	H	227	X	S TK RESVR PISTON	1	A	15	ON	OFF				87 44900 109		1160	4	P	27-86209
	Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM		3		211			P	
	Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
B	H	315	P	SUS HYD LO PRESS	1	A	21	0	200	PIG		SLO	27 01243 11	15394	1200	3	7	27-17570
	M	32	X	CONAX VALVE COMMAND	1	A	23	OFF	ON			STP					P	
				100% CALIB	1	A	25											
				0% CALIB	1	A	27											
				50% CALIB	1	A	29											
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA		SLO	7 01731 5	6562	1235	1	P	27-11720
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA		SLO	7 01737 3	1517	1127	4	P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA		SLO	7 01737 3	1367	1127	2	P	27-11699
	U	91	V	CONNECTED TO 1 A 7	1	A	37											
	S	61	D	CONNECTED TO 1 A 9	1	A	39											
	S	62	D	CONNECTED TO 1 A 11	1	A	41											
	S	63	D	CONNECTED TO 1 A 13	1	A	43											
	P	528	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG		SLO	NAA				P	
	Z	3	E	CONNECTED TO 1 A 17	1	A	47											
					1	A	49											
					1	A	51											
	M	32	X	CONNECTED TO 1 A 23	1	A	53											
				SYNC & 100% CALIB	1	A	55											
				CONNECTED TO 1 A 55	1	A	56											
				CONNECTED TO 1 A 56	1	A	57											
				CONNECTED TO 1 A 57	1	A	58											
				CONNECTED TO 1 A 58	1	A	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 1/8 RPS	1	C	0											
8	6	197	0	RB-IP RADIAL	1	C	1			6		1K					P	
	6	197	0	CONNECTED TO 1 C 1	1	C	2											
8	6	197	0	CONNECTED TO 1 C 2	1	C	3											
8	6	197	0	CONNECTED TO 1 C 3	1	C	4											
8	6	197	0	CONNECTED TO 1 C 4	1	C	5											
8	6	197	0	CONNECTED TO 1 C 5	1	C	6											
8	6	197	0	CONNECTED TO 1 C 6	1	C	7											
8	6	197	0	CONNECTED TO 1 C 7	1	C	9											
8	6	197	0	CONNECTED TO 1 C 9	1	C	10											
8	6	197	0	CONNECTED TO 1 C 10	1	C	11											
8	6	197	0	CONNECTED TO 1 C 11	1	C	12											
8	6	197	0	CONNECTED TO 1 C 12	1	C	13											
	6	197	0	CONNECTED TO 1 C 13	1	C	14											
8	6	197	0	CONNECTED TO 1 C 14	1	C	15											
8	6	94	0	BOOM ANTENNA	1	C	17			6		1K					P	
8	6	94	0	CONNECTED TO 1 C 17	1	C	18											
8	6	94	0	CONNECTED TO 1 C 18	1	C	19											
8	6	94	0	CONNECTED TO 1 C 19	1	C	20											
8	6	94	0	CONNECTED TO 1 C 20	1	C	21											
8	6	94	0	CONNECTED TO 1 C 21	1	C	22											
8	6	94	0	CONNECTED TO 1 C 22	1	C	23											
8	6	94	0	CONNECTED TO 1 C 23	1	C	25											
8	6	94	0	CONNECTED TO 1 C 25	1	C	26											
8	6	94	0	CONNECTED TO 1 C 26	1	C	27											
8	6	94	0	CONNECTED TO 1 C 27	1	C	28											
8	6	94	0	CONNECTED TO 1 C 28	1	C	29											
8	6	94	0	CONNECTED TO 1 C 29	1	C	30											
8	6	94	0	CONNECTED TO 1 C 30	1	C	31											
8	6	587	0	POD WAVEGUIDE	1	C	33			6		1K					P	
8	6	587	0	CONNECTED TO 1 C 33	1	C	34											
8	6	587	0	CONNECTED TO 1 C 34	1	C	35											
8	6	587	0	CONNECTED TO 1 C 35	1	C	36											

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter Inc.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
B	G	587	O	CONNECTED TO 1 C 36	1	C	37											
B	G	587	O	CONNECTED TO 1 C 37	1	C	38											
B	G	587	O	CONNECTED TO 1 C 38	1	C	39											
B	G	587	O	CONNECTED TO 1 C 39	1	C	41											
B	G	587	O	CONNECTED TO 1 C 41	1	C	42											
B	G	587	O	CONNECTED TO 1 C 42	1	C	43											
B	G	587	O	CONNECTED TO 1 C 43	1	C	44											
B	G	587	O	CONNECTED TO 1 C 44	1	C	45											
B	G	587	O	CONNECTED TO 1 C 45	1	C	46											
B	G	587	O	CONNECTED TO 1 C 46	1	C	47											
				0% CALIB	1	C	49											
				50% CALIB	1	C	51											
				100% CALIB	1	C	53											
				SYNC & 100% CALIB	1	C	55											
				CONNECTED TO 1 C 55	1	C	56											
				CONNECTED TO 1 C 56	1	C	57											
				CONNECTED TO 1 C 57	1	C	58											
				CONNECTED TO 1 C 58	1	C	59											
	M	78	X	STROBE LIGHT OCCUR	1	C	95	OFF	ON	VDC		STP					P	

[illegible]

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1 VEHICLE	2 SYSTEM	3 MEASUREMENT NUMBER	4 TYPE MEASUREMENT	5 DESCRIPTION	6 TELEMETER NO.	7 SUB-CARRIER BAND NO.	8 COMMUTATOR PIN NO.	9 MEASUREMENT RANGE LOW	HIGH	10 UNITS OF FUNCTION	11 ACCURACY	12 RATE OF CHANGE OR FREQUENCY OF FUNCTION	13 TYPE OF TRANSDUCER	14 SERIAL NO.	15 STATION NO.	16 QUADRANT	17 CARD CODE	DRAWING NUMBERS
				DIGITAL CHANNEL	1	E	O											
●	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
●	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
●	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
●	I	510	W	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
●	I	505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
●	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
●	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
●	I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
●	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
				COMM. RATE CONT.	2	0	0											
					2	1												
●	P	84	B	B1 PUMP SPEED	2	2		5680	6400	RPM		SLO	27 01267 1	26	1198	4	P	27-11721
●	I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
●	I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	
●	I	549	D	PITCH SERVO ERROR	2	6		M4.6	4.1	MIN		20					P	
	I	521	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP					P	
	I	552	D	REDNDT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35					P	
●	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
●	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	A
●	I	581	W	TIME T	2	8	S					BLP					P	
●	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	DEG		100					P	
	I	522	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP					P	
●	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
●	I	523	X	S&V COF RELAYS	2	10	S	OFF	ON			BLP					P	

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1	2	3	4	5 DESCRIPTION	6	7	8	9 MEASUREMENT RANGE LOW	HIGH	10	11	12	13 TYPE OF TRANSDUCER	14 SERIAL NO.	15 STATION NO.	16	17	DRAWING NUMBERS
				COMM. RATE " 3 RPS	2	11	0											
	S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG		30	7 01680	9 769	1210	Y	M	
	S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG		30	7 01680	3 11598	1210	X	M	
	S	205	D	B1 YAW	2	11	5	M5	5	DEG		30	7 01680	7 740	1212	4	M	
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG		30	7 01680	7 746	1212	Y	M	
	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S		15		0015			M	
	S	93	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S		15		0015			M	
	S	92	R	ROLL RATE GYRO	2	11	13	M8	8	D/S		15		0015			M	
@	I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6					M	
	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
@	I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10					M	
	I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20					M	
@	I	552	D	REDNDT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
				100% CALIB	2	11	25											
				0% CALIB	2	11	27											
				50% CALIB	2	11	29											
@	I	589	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
@	I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
@	I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100					M	
					2	11	37											
	H	224	P	S HYD SYS LO PRESS	2	11	39	0	200	PIG		SLO	27 01243	11 15297	1175	4	P	27-11815
	H	219	P	S TK RESVR GAS	2	11	41	0	200	PIG		SLO	27 01243	7 2009	1206	1	P	27-11651
	P	279	P	B2 LO2 PR LUB OIL MN	2	11	43	0	125	PIA		SLO	27 01243	9 0041F	1164	3	P	27-11722
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIG		SLO	27 01243	9 [illegible]031	1173	1	P	27-11721
	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA		SLO	[illegible]7 01731	7 7025	1235	1	P	27-11720
	P	183	P	B1 TURBOPUMP GEARBOX	2	11	49	0	15	PIG		SLO	27 01243	5 1608T	1173	1	P	27-11721
	P	188	P	[illegible] TURBOPUMP GEARBOX	2	11	51	0	15	PIG		SLO	27 01243	5 15795	1164	5	P	27-11722
					2	11	53											
				SYNC & 100% CALIB	2	11	55											
				CONNECTED TO 2 11 55	2	11	56											
				CONNECTED TO 2 11 56	2	11	57											
				CONNECTED TO 2 11 57	2	11	58											
				CONNECTED TO 2 11 58	2	11	59											

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	… tion of	Accuracy	Rate of Change or Frequency or Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE CONT.	2	12	0											
B	P	798	A	LO2 LINE AXIAL ACCEL	2	12		M60	60	G		100	27 01277	5 500	1111	1	P	27-11787
B	P	759	A	LO2 LINE LAT ACCEL	2	13		M60	60	G		100	27 01277	5 512	1111	1	P	27-11787
#	I	516	A	ACCELEROMETER YF1	2	A				G							P	
#	I	519	A	ACCELEROMETER YF2	2	C				G							P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Clue	Drawing Number
				COMM. RATE 30 RPS	2	E	0											
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA		150	7 01731 5	6621	1235	1	P	27-11720
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA		15	7 01731 7	4297	1235	1	P	27-11720
	S	223	D	V2 PITCH	2	E	5	0	50	DEG		10	7 01414 1	10872	1123	3	P	27-11699
	S	222	D	V1 PITCH	2	E	7	0	50	DEG		10	7 01414 1	07683	1123	4	P	27-11699
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA		15	7 01731 1	6145	1244	1	P	27-11684
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA		15	7 01731 1	6282	1244	2	P	27-11684
B	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG		10	27 01205 1	300H	1129	4	P	27-11699
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG		10	7 01680 7	784	1212	2	P	27-11722
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG		10	27 01205 1	338H	1129	2	P	27-11699
	S	206	D	B2 YAW	2	E	19	M5	5	DEG		10	7 01680 7	946	1212	2	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	P91		15	7 01731 5	6039	1173	1	P	27-11721
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA		15	7 01731 5	6593B	1144	3	P	27-11722
				100% CALIB	2	E	25											
				0% CALIB	2	E	27											
				50% CALIB	2	E	29											
	P	6	P	CONNECTED TO 2 E 1	2	E	31											
	P	330	P	CONNECTED TO 2 E 3	2	E	33											
	S	223	D	CONNECTED TO 2 E 5	2	E	35											
	S	222	D	CONNECTED TO 2 E 7	2	E	37											
	P	60	P	CONNECTED TO 2 E 9	2	E	39											
	P	59	P	CONNECTED TO 2 E 11	2	E	41											
	S	233	D	CONNECTED TO 2 E 13	2	E	43											
	S	204	D	CONNECTED TO 2 E 15	2	E	45											
	S	234	D	CONNECTED TO 2 E 17	2	E	47											
	S	206	D	CONNECTED TO 2 E 19	2	E	49											
	P	39	P	CONNECTED TO 2 E 21	2	E	51											
	P	38	P	CONNECTED TO 2 E 23	2	E	53											
				SYNC & 100% CALIB	2	E	55											
				CONNECTED TO 2 E 55	2	E	56											
				CONNECTED TO 2 E 56	2	E	57											
				CONNECTED TO 2 E 57	2	E	58											
				CONNECTED TO 2 E 58	2	E	59											
	D	3	X	RSC DESTRUCT OUTPUT	2	E	9S	0	30	VDC		STP					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemetry No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
				COMM. RATE CONT.	3	0	0											
	M	143	D	BOOSTER SEPARATION	3	7		0	8	IN		14	7 01676 1	LU138	1131	1	F	27-11723
B	M	84	X	B STGG LATCH MSW Q1	3	8		OFF	ON				87 44900 109		1145	1	P	
B	M	85	X	B STGG LATCH MSW Q2	3	8		OFF	ON				87 44900 109		1145	1	[illegible]	
B	M	86	X	B STGG LATCH MSW Q3	3	8		OFF	ON				87 44900 109		1145	1	P	
B	M	[illegible]7	X	B STGG LATCH MSW Q4	3	8		OFF	ON				87 44900 109		1145	1	P	27-11797
	[illegible]	943	V	COMPUTER M50 PSUP	3	9		M55	0	VDC		SLO					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE 2.5 RPS	3	11	0											
	A	285	I	THRUST SECT LITE B1	3	11	1	0	600	FTC			7 01709 1		1226	4	P	27-11739
	A	744	I	THRUST SECT LITE B2	3	11	3	0	600	FTC			7 01709 1		1220	2	P	27-11735
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247 3	89L	121[illegible]	1	P	27-11721
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247 3	48L	1210	3	P	27-11722
	P	709	T	SGG COMBUSTOR	3	11	9	0	1100	DGF		SLO	27 01247 3	94L	1234	4	P	27-11723
					3	11	11											
					3	11	13											
					3	11	15											
					3	11	17											
					3	11	19											
					3	11	21											
					3	11	23											
				100% CALIB	3	11	25											
				0% CALIB	3	11	27											
				0% CALIB	3	11	29											
					3	11	31											
					3	11	33											
					3	11	35											
					3	11	37											
					3	11	39											
					3	11	41											
					3	11	43											
					3	11	45											
					3	11	47											
					3	11	49											
					3	11	51											
					3	11	53											
				SYC & 100% CALIB	3	11	55											
				CONNECTED TO 3 11 55	3	11	56											
				CONNECTED TO 3 11 56	3	11	57											
				CONNECTED TO 3 11 57	3	11	58											
				CONNECTED TO 3 11 58	3	11	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	FREQUENCY RESPONSE	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE CONT.	3	13	0											
@	I	517	A	ACCELEROMETER ZF1	3	13				G							P	
@	I	520	A	ACCELEROMETER ZF2	3	A				G							P	
@	I	513	A	ACCEL XF1 DIRECT	3	C				G							P	
@	I	514	A	ACCEL XF2 DIRECT	3	E				G							P	

SECTION 10

LANDLINE INSTRUMENTATION

The Landline Instrumentation presented in this section contains the latest available characteristics of the individual measurements. In addition the type of recordings indicated.

A	F	1125	P	B CTL PNEU REG OUT	S	200	800	PIA	16	SLO	7	01731	3	2841	1243 4	27-16500
A	F	1194	P	FACILITY GN_2 SUPPLY	S	0	2400	PIG	48	SLO						
A	F	1288	P	ST PNEU REG OUT	S	0	800	PIA	10	SLO	7	01720	1		1223 2	27-16505
A	G	1[illegible]6	V	PITCH ANALOG	D	M30	30	VDC	0.2	SLO						27-0001-3

VEHICLE

MEASUREMENT NUMBER

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

UNITS OF FUNCTION

ACCURACY REQUIREMENT

Present in units of the function measured.

RECORDER ASSIGNMENT

This code defines the method to be utilized to record the measurement. A double letter here indicates that this measurement will be recorded on two different types of recorders.

FREQUENCY RESPONSE

Denotes the frequency response requirements in cps of the instrumentation system for the measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

TRANSDUCER SERIAL NUMBER

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	D			RANGE SAFETY SYSTEM														
	D	M142	V	RSC 31 BAT DC		M											P	
	D	M143	V	RSC #2 BAT DC		M											P	
	D	M140	W	RSC #1 TOTAL TIMER		M		0	1000	HR							P	
	D	M141	W	RSC #2 TOTAL TIMER		M		0	1000	HR							P	
	D	M150	W	RSC #1 & 2 BATTERY		M		0	1000	HR							P	
	E			ELECTRICAL POWER SYS														
	E	M066	C	MISSILE DC AMPS		M		0	200	AMP							P	
	E	M068	C	EMERGENCY GENERATOR		M		0	200	AMP							P	
	E	M005	Q	MISSILE INT PHASE A		M		396	404	CPS							P	
	E	M029	Q	MISSILE EXT PHASE A		M		396	404	CPS							P	
	E	M031	Q	PHASE A EXT @ MSL		M		396	404	CPS							P	
	E	M003	V	MISSILE INTERNAL DC		M		0	40	VDC							P	
	E	M006	V	MISSILE INTERNAL AC		M		110	120	VAC							P	
	E	M022	V	MISSILE AC EXT @ MSL		M		110	120	VAC							P	
	E	M023	V	MISSILE EXTERNAL AC		M		110	120	VAC							P	
	E	M030	V	MISSILE DC EXT @ MSL		M		0	40	VDC							P	
	E	M065	V	MISSILE EXTERNAL DC		M		0	40	VDC							P	
	E	M109	W	MAIN MSL BATT TIMER		M											P	
	E	M110	W	INVERTER TIMER		M											P	
	F			PNEUMATIC SYSTEM														
	F	3309	D	LO2 ULLAGE VENT VLV		R		OPN	C[illegible]			SLO					P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	RANGE LOW	RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OF FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	F	1001	P	LO2 TANK HELIUM		M		0	50	PIG	1	SLO	27 01263 5	15389	484	3	P	27-11679
	F	M003	P	LO2 TANK HELIUM		M		0	30	PIG			27 01263 5	15389	484	3	P	27-11679
	F	1003	P	FUEL TANK HELIUM		O		0	75	PIG	1	SLO	27 01263 7	0011F	968	3	P	27-11683
	F	M003	P	FUEL TANK HELIUM		M		0	75	PIG			27 01263 7	0011F	968	3	P	27-11683
	F	M052	P	LN2 PRESSURE		M		0	4000	PIG							P	
	F	M053	P	NORM SUP PRESSURE		M		0	4000	PIG							P	
	F	M054	P	EMERG SUP PRESSURE		M		0	4000	PIG							P	
	F	M114	P	DIFFERENTIAL PRESS		M		0	5	PID							P	
	F	1145	P	S CTL HE BTL DISCH		S		0	3500	PIA	105	SLO	7 01720 5	4366	1213	2	P	27-11650
	F	M145	P	S CTL HE BTL DISCH		M		0	3500	PIA	105	SLO	7 01720 5	4366	1213	2	P	27-11650
	F	1194	P	FACILITY GN2 SUPPLY		S		0	2400	PIG	48	SLO					P	
	F	1244	P	B TANK HE BOTTLES HI		S		0	3500	PIG	65	SLO	7 01720 5	5459	1187	4	P	27-116[illegible]
	F	M244	P	B TANK HE BOTTLES HI		M		0	4000	PIG			7 01720 5	5459	1200	4	P	27-11682
	F	3[illegible]		GND LO2 ULLAGE TANK		S		20	30	PIG	.1	SLO					P	
	F	3302	P	GND FUEL ULLAGE TANK		S		55	65	PIG	.1	SLO					P	
	F	M247	T	BSTR TANK TEMP		M		M80	M380	DGF			7 01633 5	80L	1221	4	P	27-11682
	I			INERTIAL GUIDANCE														
	I	1515	A	ACCELEROMETER X F1													P	
	I	1516	A	ACCELEROMETER Y F1													P	
	I	1517	A	ACCELEROMETER Z F1													P	
	I	1518	A	ACCELEROMETER X F2													P	
	I	1519	A	ACCELEROMETER Y F2													P	
	I	1520	A	ACCELEROMETER Z F2													P	
	I	1991	C	PITCH GYRO TORQUE				M75	75	MA							P	
	I	1992	C	ROLL GYRO TORQUE				M75	75	MA							P	
	I	1993	C	YAW GYRO TORQUE				M75	75	MA							P	
	I	1994	D	PENDULUM #1 NULL		D	4	M20	20	MIN							P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBER
●	I	1595	D	PENDULUM #2 NULL		D	5	M20	20	MIN							P	
●	I	1596	D	OPTIC SIGNAL		D	6	M7.5	7.5	MIN							P	
●	I	1505	H	COMPUTER POSITION X				0	6K	NM		10K					P	
●	I	1506	H	COMPUTER POSITION Y				M300	500	NM		10K					P	
●	I	1507	H	COMPUTER POSITION Z				0	700	NM		10K					P	
●	I	1508	H	RANGE ERROR FUNCTION				0	6K	NM		10K					P	
●	I	1509	H	AZM ERROR FUNCTION				M300	500	NM		10K					P	
●	I	1502	L	COMPUTER VELOCITY X				0	22K	F/S		10K					P	
●	I	1503	L	COMPUTER VELOCITY Y				0	4K	F/S		10K					P	
●	I	1504	L	COMPUTER VELOCITY Z				0	6K	F/S		10K					P	
	I	1601	V	400 CPS REFERENCE													P	
	I	1606	V	COMPUTER RESET		O		0	10	VDC	1SB						P	
●	I	1510	W	ELAPSED TIME													P	
	I	1521	X	VERN ENGINE COF SIG				ON	OFF								P	
	I	1522	X	S ENGINE COF SIG				ON	OFF								P	
	I	1570	X	STAGING SIG													P	
	I	1603	X	WORD GATE FIVE				ON	OFF								P	
	I	1604	X	MULT GATE SIX				ON	OFF								P	
	I	1605	X	112 CPS GATE				ON	OFF								P	
	M			MISCELLANEOUS														
	M	M144	V	STROBELIGHT BATTERY		M											P	
	N			FACILITIES & SITE														
	M	1090	X	MSL ONE INCH MOTION		R		OFF	ON								P	
	M	M362	D	36 INCH WATER VALVE		M											P	
	M	3301	P	SLUG CH GN2 IN VTRI		S		50	350	P/M		SLO					P	

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change of Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Calib Code	Drawing Numbers
	N	1309	P	SLUG CH LO2 INLET		S		0	100	PIG		SLO					P	
	N	1310	P	SLUG CH LO2 DISCH		S		0	500	PIG		SLO					P	
	N	1311	P	SLUG CH LO2 DISCH		S		0	500	PIG		SLO					P	
	N	1313	T	SLUG CH LO2 INLET		S		M250	M325	DGF		SLO					P	
	N	1314	T	SLUG CH LO2 DISCH		S		M250	M325	DGF		SLO					P	
	N	1335	X	SLG CH LO2 DISCH VLV		R		OPEN	CLOS			SLO					P	
	N	3335	X	SLG CH LO2 DISCH VLV		R		OFF	ON			STP					P	
	N	1336	X	SLG CH LO2 VENT VLV		R		OPEN	CLOS			SLO					P	
	N	3336	X	SLG CH LO2 VENT VLV		R		OFF	ON			STP					P	
	N	1337	X	SLG CH LO2 INLET VLV		R		OPEN	CLOS			SLO					P	
	N	3337	X	SLG CH LO2 INLET VLV		R		OFF	ON			STP					P	
	N	1338	X	SLG CH LN2 INLET VLV		R		OPEN	CLOS			SLO					P	
	N	1339	X	SLG CH GN2 INLET VLV		R		OPEN	CLOS			SLO					P	
	N	3356	X	SLG CH LO2 LOW LEVEL		R		OFF	ON			STP					P	
	N	3932	X	LO2 TPNG VLV CLOSED		R		OFF	ON			STP					P	
	N	3933	X	LO2 TPNG VLV OPEN		R		OFF	ON			STP					P	
	N	1979	X	PRESS VLV CLOSED		R		OFF	ON			STP					P	
	P			PROPULSION SYSTEM														
	P	M242	B	PUMP LC SPEED		M		0	100	PCT							P	
	P	M685	M	FUEL IN MISSILE		M		0	10K	GAL							P	
	P	1010	P	B1 LUBE OIL INJ MAN		S		0	1000	PIA	50	SLO	7 01731 7	5556	1173	1	P	27-11721
	P	1011	P	B2 LUBE OIL INJ MAN		S		0	1000	PIA	50	SLO	7 01731 7	5753	1144	3	P	27-11722
	P	1232	P	S LO2 SEAL CAVITY		S		0	15	PIG	2	SLO	27 01243 5	15303	1235	1	P	27-11720
	P	M373	P	LO2 STORAGE TANK		M		0	50	PIG							P	
	P	M430	P	FUEL STORAGE TANK		M		0	10	PIG	.6	SLO					P	
	P	1465	P	S LO PR LUBE OIL MAN		S		0	100	PIG		SLO	27 01243 9	00007	1235	1	P	27-11720
	P	1474	P	V CTL PRESS REG OUT		S		200	800	PIA	16	SLO	7 01731 3		1208	1	P	

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	Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
																			27-11651
		P	1020	T	B1 LOX PUMP INLET		S		M325	M275	DGF	1	SLO	7 01649 9		1182	4	P	27-11721
		P	1054	T	B2 LOX PUMP INLET		S		M325	M275	DGF	1	SLO	7 01649 9		1189	2	P	27-11721
		P	1325	T	ENG COMP AMBIENT		S		M120	500	DGF	3	SLO	7 01684 5		1208	1	P	27-11651
		F	1710	T	SE ENVIRONMENT		S		M100	500	DGF		SLO	7 01684 5		1235	3	P	27-17540
		P	1711	T	B1 NACELLE AMBIENT		S		M100	500	DGF		SLO	7 01684 5		1204	4	P	27-17546
		P	1712	T	B2 NACELLE AMBIENT		S		M100	500	DGF		SLO	7 01684 5		1204	2	P	27-17546
		P	M869	W	LO2 SLUG XFER & FIRE		M											P	
		P	1155	X	OBSERVER CUTOFF		R		OFF	ON	VDC		STP					P	
		P	1161	X	TCC START SWITCH		R		OFF	ON	VDC		STP					P	
		P	1164	X	TCC ENGINE COF SW		R		OFF	ON	VDC		STP					P	
		P	1225	X	ENGINE CONTROL READY		R		ON	OFF	VDC		STP	PEN 5A				P	
		P	1226	X	PNEUMATICS CUTOFF		R		ON	OFF	VDC		STP	PEN 5A				P	
		P	1227	X	LO2 DOME PURGE		R		ON	OFF	VDC		STP	PEN 57				P	
		P	1228	X	IGNITER FUEL PURGE		R		ON	OFF	VDC		STP	PEN 58				P	
A		P	1229	X	LO2 HIGH TOPPING		R		OFF	ON	VDC		STP					P	
A		P	1230	X	LO2 LOW TOPPING		R		OFF	ON	VDC		STP					P	
A		P	1231	X	LO2 100% SLUG COM		R		OFF	ON	VDC		STP					P	
		P	1347	X	S CUTOFF RELAY		R		OFF	ON	VDC		STP					P	
		P	1544	X	VERNIER CONTROL		R		OFF	ON	VDC		STP					P	
		P	1545	X	S IGN STAGE CONTROL		R		OFF	ON	VDC		STP					P	
		P	1546	X	B2 CUTOFF RELAY		R		OFF	ON	VDC		STP					P	
		P	1547	X	B1 CUTOFF RELAY		R		OFF	ON	VDC		STP					P	
		P	1548	X	COMPLETE COF RELAY		R		OFF	ON	VDC		STP					P	
		P	1549	X	IGNITION START		R		OFF	ON	VDC		STP					P	
		P	1785	X	B SECONDARY SHUTDOWN		R		OFF	ON	VDC		STP					P	
		S			AUTOPILOT SYSTEM														
		S	M358	D	ROLL PROGRAM READOUT		M											P	
		S	1048	V	PROGRAMMER PITCH SIG		D		0	2.7	VAC	.2	SLO					P	

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MISSILE 9E LANDLINE REPORT NO. AZC-27-059-9 DATE 07 DEC 60 PAGE 6

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CALIB CODE	DRAWING NUMBER
	S	1065	V	PROGRAMMER ROLL SIG	D			0	6	VAC	3	STP					P	
	S	1107	V	B1 PCH ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	
	S	1108	V	B2 PCH ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	
	S	1113	V	V1 YAW ACTR FEEDBACK	D			M5	7	VAC	5%	30					P	
	S	1114	V	V2 YAW ACTR FEEDBACK	D			M5	7	VAC	5%	30					P	
	S	1118	V	V2 ROL ACTR FEEDBACK	D			M11	11	VAC	5%	30					P	
	S	1119	V	V1 ROL ACTR FEEDBACK	D			M11	11	VAC	5%	30					P	
	S	1121	V	GYRO TEST SIG	D			M5	5	VAC	.1	STP					P	
	S	1123	V	SERVO TEST SIGNAL	D			M11	11	VAC	5%	30					P	
	S	1128	V	B1 YAW ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	
	S	1129	V	B2 YAW ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	
	S	1147	V	PITCH GYRO AMP OUT	D			M10	10	VAC	1	30					P	
	S	1148	V	YAW GYRO AMP OUT	D			M10	10	VAC	1	30					P	
	S	1149	V	ROLL GYRO AMP OUT	D			M10	10	VAC	1	30					P	
	S	1216	V	S PCH ACTR FEEDBACK	D			M10	10	VAC	5%	30					P	
	S	1217	V	S YAW ACTR FEEDBACK	D			M10	10	VAC	5%	30					P	
	S	M270	V	FINE HEATER-PITCH	M			0	150	VAC							P	
	S	M271	V	FINE HEATER-YAW	M			0	150	VAC							P	
	S	M272	V	FINE HEATER-ROLL	M			0	150	VAC							P	
	S	M176	W	PROGRAM RUN TIME	M			0	999	SEC							P	
A	S	M282	W	DECADE EVENT TIMER	M			0	10K	SEC							P	
	S	1235	X	PROGRAMMER RUN TIME	R			OFF	ON	VDC		STP					P	
	S	1370	X	STAGING	R			OFF	ON	VDC		STP					P	
	S	1371	X	BOOSTER JETTISON	R			OFF	ON	VDC		STP					P	
	S	1372	X	PRESSURIZE VERN TANK	R			OFF	ON	VDC		STP					P	
	S	1373	X	BOOSTER CUTOFF	R			OFF	ON	VDC		STP					P	
	S	1374	X	SUSTAINER CUTOFF	R			OFF	ON	VDC		STP					P	
	S	1375	X	VSHPS BACK-UP SIGNAL	R			OFF	ON	VDC		STP					P	
	S	1376	X	VERNIER CUTOFF	R			OFF	ON	VDC		STP					P	
	S	1377	X	EJECT RV UMBILICAL	R			OFF	ON	VDC		STP					P	
	S	1378	X	RV JETTISON	R			OFF	ON	VDC		STP					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
	S	1379	X	FIRE RETRO ROCKETS		R		OFF	ON	VDC		STP					P	
	T			TELEMETERING SYSTEM														
	T	M140	V	TLM #1 BAT DC		M											P	
	T	M141	V	TLM #1 EXTERNAL DC		M											P	
	T	M144	V	TLM #2 BAT DC		M											P	
	T	M145	V	TLM #2 EXTERNAL DC		M											P	
	T	M146	V	TLM #3 BAT DC		M											P	
	T	M147	V	TLM #3 EXTERNAL DC		M											P	
	T	M156	V	TLM 1 FIL INT DC		M											P	
	T	M157	V	TLM 1 FIL EXT DC		M											P	
	T	M158	V	TLM 2 FIL INT DC		M											P	
	T	M159	V	TLM 2 FIL EXT DC		M											P	
	T	M160	V	TLM 3 FIL INT DC		M											P	
	T	M161	V	TLM 3 FIL EXT DC		M											P	
	T	M150	W	TLM #1 TOTAL		M		0	1000	HR							P	
	T	M151	W	TLM #2 TOTAL		M		0	1000	HR							P	
	T	M152	W	TLM #3 TOTAL		M		0	1000	HR							P	
	T	M153	W	TLM #1 BAT TIMER		M											P	
	T	M154	W	TLM #2 BAT TIMER		M											P	
	T	M155	W	TLM #1 BATTERY		M		0	60	MIN							P	
	U			PROPELLANT UTILIZ														
	U	1091	V	ERROR RATIO DEMOD OP		S		M20	20	VDC	.5	20					P	
	U	1200	X	LOX 100% SLUG COF-1		R		OFF	ON	VDC		STP					P	
	U	1201	X	LOX TOPG HI CTL-1		R		OFF	ON	VDC		STP					P	
	U	1202	X	LOX TOPG LO CTL-1		R		OFF	ON	VDC		STP					P	
	U	1203	X	LOX 99% RAPID LOAD-1		R		OFF	ON	VDC		STP					P	
	U	1204	X	FUEL 100% SEC CTL		R		OFF	ON	VDC		STP					P	

REPORT NO. AZC-27-059-9A [redacted]

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Vehicle / System (1, 2)	Measurement Number (3)	Type Measurement (4)	Description (5)	Recorder (6)	Track (7)	Channel (8)	Measurement Range Low (9)	Measurement Range High (9)	Units of Function (10)	Accuracy (11)	Rate of Change or Frequency of Function (12)	Type of Transducer (13)	Serial No. (14)	Station No. (15)	Quadrant (16)	Card Code (17)	Drawing Numbers
-	1205	X	FUEL 100% PRI CTL		R		OFF	ON	VDC		STP					P	
U	1206	X	FUEL 95% SEC CTL		R		OFF	ON	VDC		STP					P	
U	1207	X	FUEL 95% PRI CTL		R		OFF	ON	VDC		STP					P	
U	1208	X	LO2 100% SLUG COF-2		R		OFF	ON	VDC		STP					P	
U	1209	X	LO2 TOPG HI CTL-2		R		OFF	ON	VDC		STP					P	
U	1210	X	LO2 TOPG LO CTL-2		R		OFF	ON	VDC		STP					P	
U	1211	X	LO2 95% RAPID LOAD-2		R		OFF	ON	VDC		STP					P	

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MISSILE 9E LANDLINE REPORT NO. AZC-27-059-9 DATE 07 DEC 60 PAGE 8

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	U	1205	X	FUEL 100% PRI CTL		R		OFF	ON	VDC		STP					P	
	U	1206	X	FUEL 95% SEC CTL		R		OFF	ON	VDC		STP					P	
	U	1207	X	FUEL 95% PRI CTL		R		OFF	ON	VDC		STP					P	
	U	1208	X	LO2 100% SLUG COF-2		R		OFF	ON	VDC		STP					P	
	U	1209	X	LO2 TOPG HI CTL-2		R		OFF	ON	VDC		STP					P	
	U	1210	X	LO2 TOPG LO CTL-2		R		OFF	ON	VDC		STP					P	
	U	1211	X	LO2 95% RAPID LOAD-2		R		OFF	ON	VDC		STP					P	

[redacted]AL

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CONVAIR (ASTRONAUTICS) DIVISION
GENERAL DYNAMICS CORPORATION

WS-107A-1

INSTRUMENTATION CONFIGURATION

SERIES E ARTICLE 12

AMR

PREPARED BY TEST PLANNING

CO-ORDINATED BY W S Becker
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CONVAIR ASTRONAUTICS

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
A	21 FEB '61	WSB	ADDITIONS:	
			A5P, A1T, A2T, A3T, A4T, A6T, A412T,	ALL TABS
			A438T, A440T, G940, G1970, G5870,	
			G588P, G589P, G281V, G302C, H52P,	
			H130P, , H185P, , H212P,	
			H219P, H379P, H398P, H1360P, H383R,	
			H384R, H385R, H386R, H387X, H388X,	
			H389X, H1187X, H1188X, I1606V,	
			, L1452P, L1453P, L1446D, L1447D,	
			L1448D, L1449D, P1225X, P1226X, P1227X,	
			P1228X, P1229X, P1230X, P1231X, S1370X,	
			S1371X, S1373X, S1374X, S1375X, S1376X,	
			S1377X, S1378X, S1379X, T2T, T3T, T103T,	
			T162T	
			REASONS FOR REVISION "A" CHANGES	4-1
A	21 FEB '61	WSB	DELETIONS:	
			FM248P, H315P, I1603X, I1604X,	ALL TABS
			I1605X, P798A, P1528D, P1010P,	

FORM NO. A-761-1

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
A	21 FEB '61	WSB	DELETIONS (CONT.)	
			P1011P, P1232P, P1465P, P617T, P1709T,	ALL TABS
			P1713T, P1714T, P1437W, P1454W, P1455W,	
			P1156X, P1157X, P1192X, P1193X, P1438X,	
			P1588X	

[redacted]

FOREWORD

This report has been published in accordance with contractual requirements as cited in Convair-Astronautics Report ZM-7-289. It describes the instrumentation release for Missile 12-E as of 21 February 1961. A

Information presented here will be used by Air Force, Associate Contractors, Design, Operation, and Field Test Groups. Measurement modification will either originate in the Instrumentation Section of the Test Planning Group or will be submitted as a recommendation to this group.

[redacted]

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SUMMARY

The instrumentation configuration for this missile has been established through a study of program test objectives, systems analysis, and operating considerations. A discussion of missile instrumentation and associated characteristics has been summarized in Report AZC 27 059. For a detailed description of the various missile systems, test objectives, and general test program see Report AE60 0435.

The specific measurements to be transmitted via telemeter have been tabulated and are listed in Sections 8 and 9 in terms of instrumentation systems and telemeter channel assignments.

In addition to the telemetry, the landline instrumentation program for this missile has been included in this report in the form of a master tabulation of landline measurement characteristics (Section 10).

To clarify specific measurements, instrumentation location schematics have been included in Report AZC 27 059, Section 7.

There are a total of 180 telemetered measurements on 41 channels in this missile divided as follows

	ACCEL	DEFL	POS	PRES	TEMP	VOLT	DIS POS	MISC	TOTAL
A/FRM				1	15			2	18
PNEU				9	4				13
GUID				2		3		6	11
HYD				12			4	4	20
INER GUID	6	4	5	1	5	11	8	5	45
PROP	1	2		20	4		3	3	33
A P SYS		13					1	3	17
MISC			2			6	9	6	23
TOTAL	7	19	7	45	28	20	26	29	180

There are also 239 measurements recorded and displayed via 239 landline channels

REASONS FOR REVISION "A" CHANGES

INTRODUCTION

Due to the inflight failures of missiles 3E, 4E and 8E additional instrumentation has also been added to missile 12E to continue the evaluation of the airborne hydraulic system, effects of radiant heating and aerodynamic heating of V / electrical components

1 The bracket which mounts the sustainer engine control package to the engine has been strengthened by Rocketdyne to preclude any inflight failures. Break wires attached to the sustainer engine control package (H387X, H388X) and main hydraulic distribution manifold (H389X) will indicate mounting bracket failures. A measurement recommended by Rocketdyne for analysis of the sustainer engine control package performance has also been added. Accumulator gas pressure (H398P)

Measurements of flow to the sustainer engine control (H384R), to the high pressure distribution manifold (H386R), to the hydraulic reservoir via the high pressure relief valve (H387R) and from the vernier distribution manifold (H385R) will provide data on overall system performance as well as isolate the location of a failure in the high pressure portion of the system. A low pressure measurement in the vernier return line (H412P) in conjunction with the Hydraulic Pumping Unit Sustainer Return (H1360P) pressure will provide additional data for a pressure survey in this area of the system. Data for malfunction analysis of the high pressure system will also be provided by pump discharge (H130P), main system accumulator (H52P) and line (H191P) pressure measurements

A check valve has been installed in the sustainer high pressure line upstream of the staging disconnect. This will prevent loss of hydraulic fluid in the event that the disconnect couplings become damaged. A pressure measurement located between the check valve and the rise-off disconnect (H379P) will provide data on proper sealing and structural integrity of the disconnect coupling. A heat shield has been added over the rise off disconnect panel and sliding poppets have been added to the disconnects themselves to protect them from radiant heating. A thermocouple (A6T) will be located between the disconnect heat shield and disconnect panel to measure ambient inflight temperatures

In addition to the foregoing, measurements (H140P) Sustainer/Vernier Hydraulic Pressure, and (H219P) Sustainer Tank Reservoir Gas Pressure, and (H185P) Sustainer Hydraulic Pump Inlet Pressure will also be installed. These measurements were planned for previously as part of the over-all instrumentation package for missile 12E. (See Figure 1.)

Sequence measurements in the Hydraulic Pumping Unit will provide data on booster (H1187X) and Sustainer (H1188X) system hydraulic fluid evacuation (see figure 1). Information on missile tilt or roll at rise off will be provided by displacement measurements at Quadrant I (L1446D) II (L1447D), III (L1448D) and IV (L1449D) (see figure 2). The extensiometers are located on the upper pedestal supports on the launcher.

II. In addition to the thermocouples, three (3) calorimeters have been placed on the aft heat shield on 12E. See Figure 2 for approximate locations:

A412T BLACK CALOR QIV
A438T 38 GM CALOR QIV
A440T 19 GM CALOR QIV

The calorimeters are clustered in groups of three to give the heat transfer coefficient along with readings of convection and radiation quantities. The 19 gram gold calorimeter provides a measure of convection heat while the black calorimeter will provide total heating information. The third calorimeter in the group, 38 grams, combined with the other two calorimeters will give the heat transfer coefficient. All calorimeters are mounted facing aft and approximately 3 inches in diameter for each calorimeter.

Due to the danger of soot or other elements plating the surface of the relatively large calorimeter clusters during launch period and producing incorrect data, two nine (9) inch pie tins will be placed over the clusters as covers. The pie tins will be mechanically removed after the first ten (10) feet of flight. Camera coverage will substantiate the successful removal of the two pie tins.

III. High temperatures in the conduit, electrical connectors, and the fairings around the vernier engines have been considered as a possible cause for short circuiting. To

accurately determine the inflight temperature environment at these locations the following measurements will be made on 32E

A1T V2 FAIRING AMBIENT (Inside)
A2T V2 CLAMSHELL AMBIENT (Inside)
A3T V2 CONDUIT (Near Center) and
A4T V2 SERVO ELECTRICAL CONNECTOR (Surface)

Thermal input will be a combination of aerodynamics engine plume and electrical component heating The clamshell fairing mounted on the side of the vernier engine has several large openings which facilitate gimbaling Measurement of the clamshell interior pressure (A5P) will be made to investigate what effect "ram air" entering into this fairing may have on its environment

Temperatures of thermocouple reference junctions (T2T T3T T103T T162T) will be made to insure accurate data from all thermocouples These reference junctions are used with measurements made on the booster sustainer and vernier engine areas respectively

IV Redesign of the cooling distribution system for ARMA B1 and B2 pods requires data provided by the following additional instrumentation 12 temperature measurements on the ROTARY INVERTER in the B2 POD QUADRANT 2 [illegible] temperature measurements on the GE PULSE BEACON in the B1 POD QUADRANT 4 8 temperature measurements on the NO 2 TELEMETRY PACKAGE B1 POD QUADRANT 1 At the launcher 10 pressure measurements have been added for PITOT TUBES and 5 temperature measurements for PORTABLE THERMOMETERS Deflection measurement (L1389D) has been added for MISSILE VERSUS DISCONNECT QUADRANTS 1 and 2 and (L1390D) for QUADRANTS 3 and 4 There are 2 additional pressure measurements (L1452P and L1453P) for the PORTABLE MANOMETERS

V To provide higher quality data during the critical portions of launch and supply booster engine rough combustion data for the first 15 feet of missile travel 2 accelerometer measurements will be monitored via trailing wire umbilical

MEAS	DESCRIPTION
P1452O	B1 NAA RCC ACCEL
P1453O	B2 NAA RCC ACCEL

VI. The booster LOX pump inlet temperature measurements have been added as operational redlines.

MEAS	DESCRIPTION
ADD	
P1020T	B1 LOX PUMP INLET
P1054T	B2 LOX PUMP INLET

VII. This measurement will indicate the number of guidance computer off-on cycles and help to establish the computer run time when combined with measurement I1510W.

ADD	
I1606V	COMPUTER RESET

VIII. The following sequence measurements will be used for flight test and systems validation, by providing time-sequence of operation of these functions during ground checkout.

ADD	
P1225X	ENGINE CONTROL READY
P1226X	PNEUMATICS CUTOFF
P1227X	LO_2 DOME PURGE
P1228X	IGNITER FUEL PURGE
P1229X	LO_2 HIGH TOPPING
P12?0X	LO_2 LOW TOPPING
P12?1X	100% SLUG COM

IX. The following measurements were added to provide a record for proof of proper sequence operation or data for failure analysis. These measurements will be made during the integrated Systems Test of the A F programmer.

ADD	
S1370X	STAGING
S1371X	BOOSTER JETTISON

MEAS	DESCRIPTION	CHANNEL
ADD		
S1372X	PRESSURIZE	
S1373X	BOOSTER CUTOFF	
S1374X	SUSTAINER CUTOFF	
S1375X	VSHPS BACK-UP SIGNAL	
S1376X	VERNIER CUTOFF	
S1377X	EJECT RV UMBILICAL	
S1378X	RV JETTISON	
S1379X	FIRE RETRO ROCKETS	

X The following measurements will be used to determine the cause of impact Predictor drop out experienced on the G E I P system on "D" AIG flights

ADD		
G[illegible]V	RB REFLECT SET	1 11 49
G30[illegible]C	RB IP MODULATOR AVG	1 11 53
G588P	WAVEGUIDE PRESS 1	1 12 7
G589P	WAVEGUIDE PRESS 2	1 12 9
G1970	RB IP RADIAL	1 C 1 thru 15
G[illegible]0	BOOM ANTENNA	1 C 17 thru 31
G5870	POD WAVEGUIDE	1 C 33 thru 47

XI The flight readiness firing (FRF) on Missile 12E has been replaced by a flight readiness demonstration (FRD). The FRD concept proceeds through the countdown up to T 5 seconds at which time the test is terminated. The landline instrumentation requirements are therefore modified as follows:

DELETE	
P1[illegible]0P	B1 LUBE OIL INJ MAN
P1[illegible]1P	B2 LUBE OIL INJ MAN
P1[illegible]2P	S LO2 SEAL CAVITY
P146[illegible]P	S LO PR OIL MAN
P1[illegible]9T	SGG COMBUSTOR

MEAS	DESCRIPTION
DELETE	
P1713T	B1 GAS GEN COMBUSTOR
P1714T	B2 GAS GEN COMBUSTOR
P1156X	B1 TBN OVRSPEED TRIP
P1157X	B2 TBN OVRSPEED TRIP
P1192X	B1 ROUGH COMB COF
P1193X	B2 ROUGH COMB COF
P1438X	S ROUGH COMB COF
P1588X	S TBN OVRSPEED TRIP
P1437W	S RCC BINARY COUNTER
P1454W	B1 RCC BINARY COUNTER
P1455W	B2 RCC BINARY COUNTER

XII. There is no sustainer LOX tank pressurization bottle on E series missiles, therefore the following measurement has been deleted.

DELETE	
FM248P	S TANK HE BOTTLE HI

XIII. Complexity prohibits making or calibrating this measurement in a way that will yield valuable data for test evaluation.

DELETE	
Z2E	KLYSTRON PWR OUTPUT

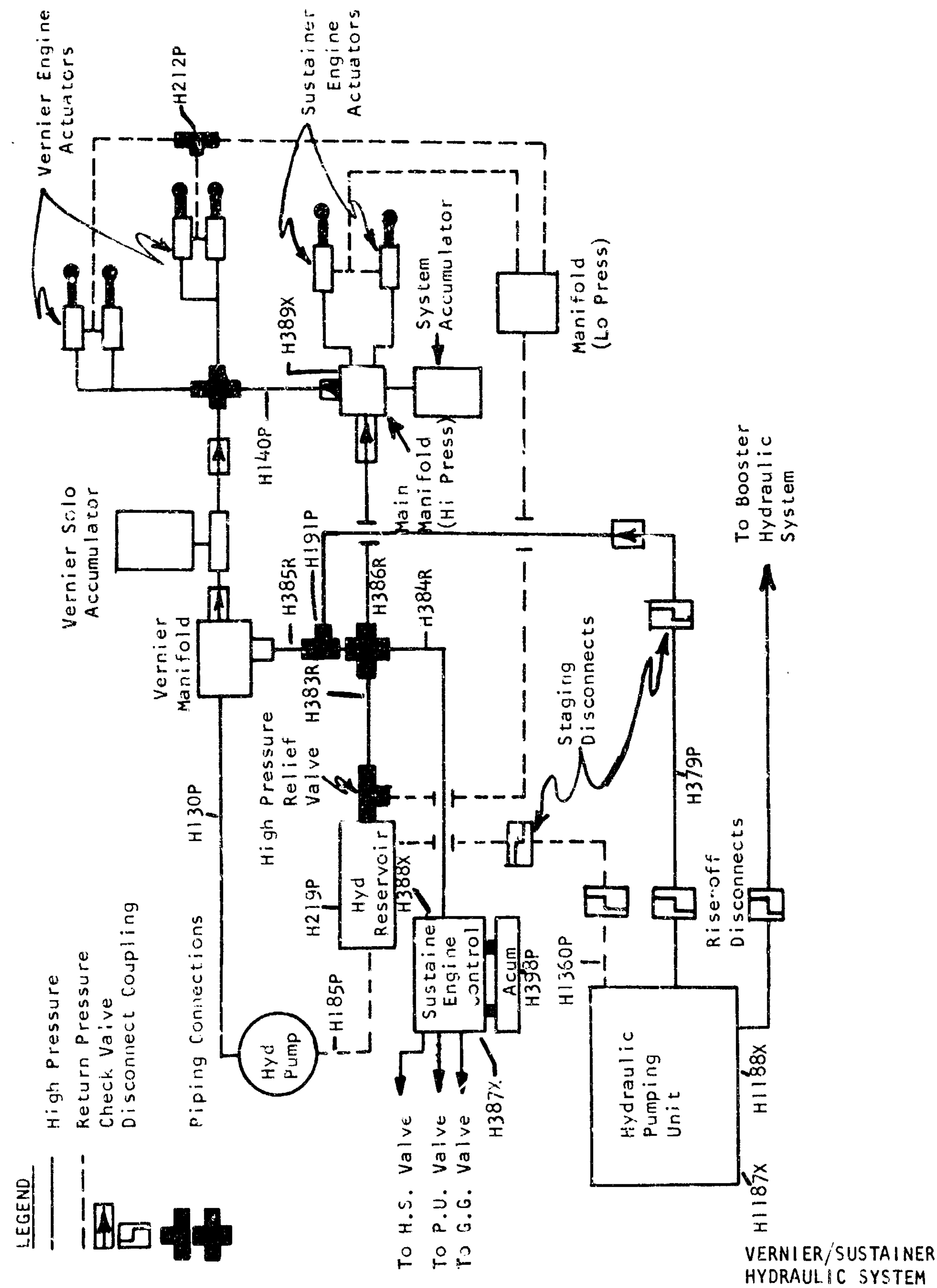
XIV. Upon reevaluation by Arma, these measurements will not provide the data originally required. Therefore they are deleted.

DELETE	
I1603X	WORD GATE FIVE
I1604X	MULT GATE SIX
I1605X	112 CPS GATE

XV. Measurement H315P has been deleted because it is a duplication of the new measurement H185P.

XVI These measurements have been deleted to provide channel space for hydraulic instrumentation

MEAS DELETE	DESCRIPTION
P798A	LOX LINE AXIAL ACCEL
P671T	TH SECTION AMB QUAD 4



VERNIER/SUSTAINER
HYDRAULIC SYSTEM

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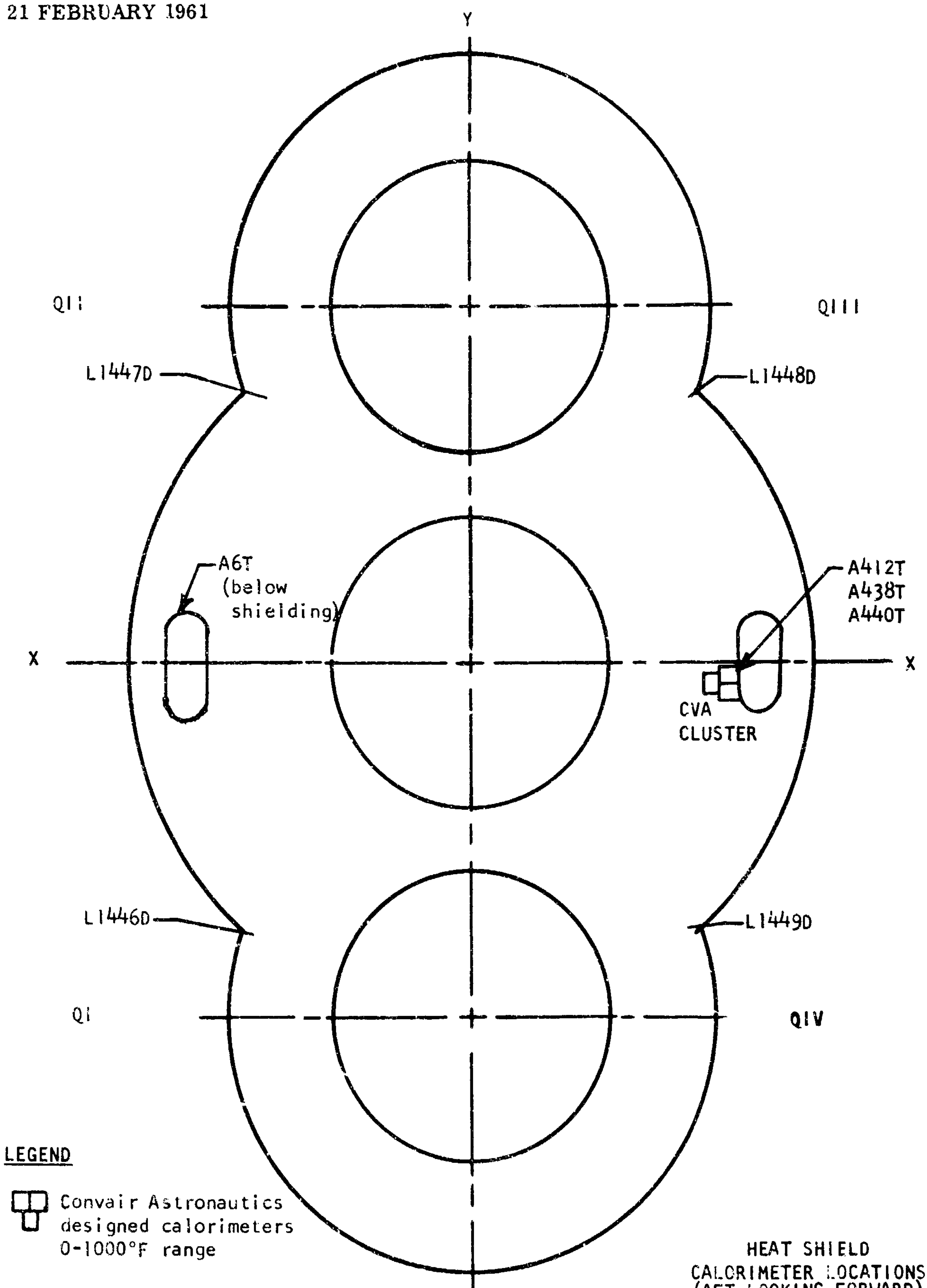
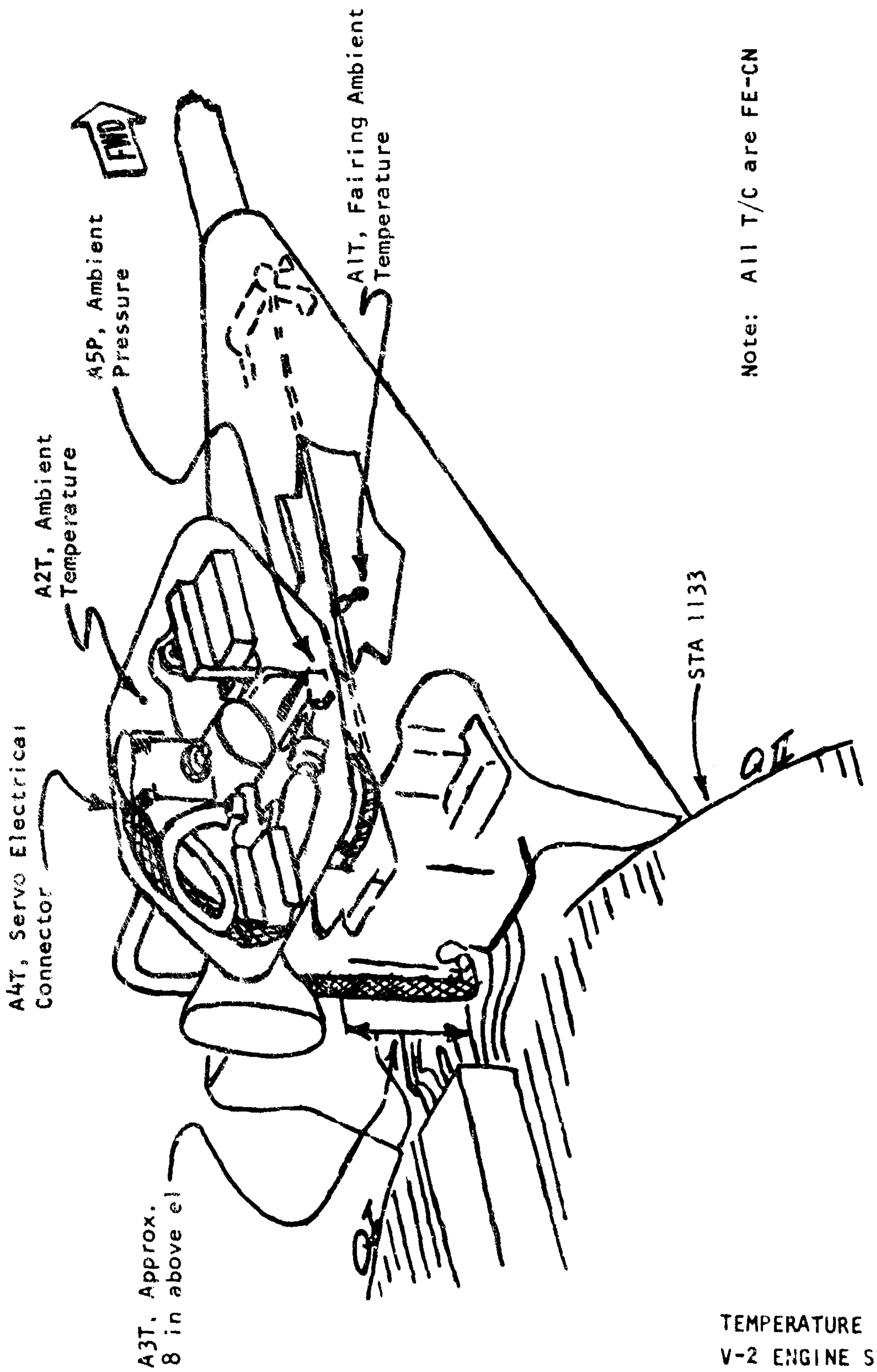


HEAT SHIELD
CALORIMETER LOCATIONS
(AFT LOOKING FORWARD)



TEMPERATURE STUDY
V-2 ENGINE SYSTEM

SECTION 8

MISSILE INSTRUMENTATION BY SYSTEM

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by system.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

VEHICLE

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

UNITS OF FUNCTION

A	F	1	P	LO_2 TANK HELIUM	1	11	35	0	45	PIA	SLO	7 01723 11		460	2		P	27-11608
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA	SLO	7 01723 13		925	Y		P	27-11609
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA	SLO	7 01731 3		1243	4		P	27-16500
A	F	260	P	B TANK HE BOTTLES LO	1	11	17	15	415	PIA	SLO	7 01727 1		1238	1		P	27-11600
A	F	261	P	S TANK HE BOTTLE LO	1	11	21	15	415	PIA	SLO	7 01727 1		1223	2		P	27-16505

MEASUREMENT NUMBER

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number assignment for the applicable measurement.

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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	Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
		A			AIRFRAME														
		A	285	I	THRUST SECT LITE B1	3	11	1	0	600	FTC			7 01709 1 3		1220	4	P	27-11733
		A	744	I	THRUST SECT LITE B2	3	11	3	0	600	FTC			7 01709 1 3		1220	2	P	27-11733
C		A	5	P	V2 CLAMSHELL INNER	2	11	49	0	15	PIA	5%	SLO	55 01107 41				P	
C		A	1	T	V2 FAIRING AMBIENT	3	11	23	0	1000	DGF	5%	SLO	FE/CN				P	
C		A	2	T	V2 CLAMSHELL AMBIENT	3	11	31	0	1000	DGF	5%	SLO	FE/CN				P	
C	●	A	3	T	V2 CONDUIT	3	11	33	0	1000	DGF	5%	SLO	FE/CN				P	
C	●	A	4	T	V2 SERVO ELEC COM	3	11	39	0	1000	DGF	5%	SLO	FE/CN				P	
C	●	~~A~~	~~6~~	~~T~~	~~ROD PANEL AMBIENT~~	~~3~~	~~11~~	~~55~~	~~0~~	~~1000~~	~~DGF~~	~~5%~~	~~SLO~~	~~FE/CN~~				P	
C		A	412	T	BLACK CALOR QUAD IV	3	11	15	0	1000	DGF	5%	SLO	27 11912 5				P	
C		A	438	T	36 GM CALOR QUAD IV	3	11	17	0	1000	DGF	5%	SLO	27 11912 3				P	
C		A	440	T	19 GM CALOR QUA. IV	3	11	21	0	1000	DGF	5%	SLO	27 11912 1				P	
		A	488	T	AMB F STG VLV Q3	1	11	15	M100	300	DGF		SLO	27 01287 3	24674	1173	3	P	27-11793
		A	638	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3	320'	1220	2	P	27-11793
		A	639	T	AMB JET RAIL Q4	1	11	45	M100	300	DGF		SLO	27 01287 3	327A	1178	4	P	27-11793
		A	640	T	FWD SIDE A FRAME Q4	1	11	31	M100	300	DGF		SLO	27 01287 3	23933	1205	4	P	27-11793
		A	641	T	AMB F STG VLV Q1	1	11	37	M100	300	DGF		SLO	27 01287 3	24678	1174	1	P	27-11793
		A	642	T	AMB NEAR B2 GG Q3	1	11	41	M100	300	DGF		SLO	27 01287 3	23929	1196	3	P	27-11794
		A	645	T	AMB FWD B1 Q4	1	11	33	M100	300	DGF		SLO	27 01287 3	24676	1196	2	P	27-11794
		D			RANGE SAFETY SYSTEM														
		D	1	V	RSC CUTOFF OUTPUT	1	1*	7	0	31	VDC	3	STP					P	
		D	1	V	RSC CUTOFF OUTPUT	1	6	5	0	31	VDC	3	BLP					M	
		D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	100K	UV	5*	SLO		157			P	
		D	3	X	RSC DESTRUCT OUTPUT	2	E	95	0	30	VDC		STP					P	
		E			ELECTRICAL POWER SYS														
		E	50	Q	400 CYCLE AC PWRSUP	1	1		370	430	CPS	4	SLO		5			P	

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	Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
		E	28	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC	1.0	SLO		5			P	
		E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC	1.0	SLO		5			P	
		E	53	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC	1.0	SLO		5			P	
		F			PNEUMATIC SYSTEM														
		F	1	P	LO2 TANK HELIUM	1	13	33	0	45	PIA	1.0	SLO	7 01723 11	5029	404	3	P	27-1?579
		F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA	3	SLO	7 01723 13	V3217	948	3	P	27-11683
		F	34	P	FUEL PRESS ORIFIC DP	1	13	51	0	7	PID	.3	80	27 01280 3	1715P	1127	1	P	27-11732
		F	65	P	LO2 TK HE LIN @ ORFC	1	A	51	0	45	PIA	.5	SLO	27 01243 5	2299	1127	4	P	27-11732
		F	114	P	LO2 PRESS REG INLET	1	13	45	0	3000	PIA		SLO	7 01731 9	6667	1187	4	P	27-11682
		F	145	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA	175	SLO	7 01720 5	5657	1213	2	P	27-11650
		F	147	P	LO2 PRESS ORFC DP	1	A	49	0	5	PID	.1	SLO	27 01280 1	297	1127	3	P	27-11732
		F	212	P	FUEL PRESS ORIFIC IN	2	11	37	40	70	PIG	2.1	SLO	27 01243 7	16095	1127	2	P	27-11732
		F	246	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA	105	SLO	7 01720 5	5452	1187	4	P	27-11682
		F	17	T	FUEL PRESS ORIFIC IN	1	11	43	0	500	DGF	12	SLO	7 01684 3	50120	1120	1	P	27-11732
		F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01684 3	50125	1205	4	P	27-11682
		F	146	T	LO2 PRESS ORFC IN	1	11	11	0	500	DGF		SLO	7 01684 3	50119	1121	3	P	27-11732
		F	247	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01633 5A	60107	1221	4	P	27-11682
		G			RADIO GUIDANCE SYS														
A		G	302	C	PB-IP MODULATOR AVG	1	11	53	M1.7	0	VDC		SLO					P	
		G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA	.03	SLO					P	
		G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E	.45	SLO					P	
A		G	94	O	BOOM ANTENNA	1	C	17			G		1K					P	
A		G	197	O	RB-IP RADIAL	1	C	1			G		1K					P	
A		G	587	O	POD WAVEGUIDE	1	C	33			G		1K					P	
A		G	588	P	WAVEGUIDE PRESS 1	1	12	7	0	15	PIA		SLO	7 01225 1	197	1123	1	P	27-11083

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	Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer		Serial No	Station No	Quadrant	Card Code	Drawing Numbers
A		G	589	P	WAVEGUIDE PRESS 2	1	12	9	0	15	PIA		SLO	7 01225	1	234	1113	1	P	27-11003
A		G	281	V	RB REFLECT SET	1	11	49	M2.5	0	VDC		SLO						P	
		G	503	V	MOD III PB AGC	1	11	17	0	M4.8	VDC	.15	SLO						P	
		G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO						P	
		H			HYDRAULIC SYSTEM															
		H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA	140	SLO	7 01731	9	5129	1173	1	P	27-11721
C	@	H	52	P	S HYD ACCUMULATOR	2	11	51	0	3500	PIA	5%	SLO	7 01720	5				P	
	●	H	130	P	S HYD PUMP DISCH	3	4		0	3500	PIA	5%	SLO	7 01720	5				P	
		H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA	45	SLO	7 01720	5	5665	1213	2	P	27-11650
	●	H	185	P	S HYD PUMP INLET	3	5		0	200	PIA	5%	SLO	27 01243	11				P	
C	●	H	191	P	S HI PR TO MANIFOLD	1	A	53	0	3500	PIA	5%	SLO	7 01720	5				P	
C		H	212	P	VERNIER RETURN	1	A	21	0	200	PIA	5%	SLO	27 01243	11				P	
		H	219	P	S TK RESVR GAS	2	11	41	0	200	PIG	3%	SLO	27 01243	7	16092	1206	1	P	27-11651
		H	224	P	B H/D SYS LO PRESS	2	11	39	0	200	PIG	3%	SLO	27 01243	11	91309	1175	4	P	27-11815
		H	225	P	B TK RESVR GAS	1	A	3	0	200	PIG	3%	SLO	27 01243	7	16006	1173	4	P	27-11815
C	●	H	379	P	SUS ROD LINE HI PR	2	11	53	0	3500	PIA	5%	SLO	7 01720	5				P	
C	●	H	398	P	NAA HYD ACCUM GAS	1	12	31	0	3500	PIA	5%	SLO	7 01720	5				P	
C	●	H	383	R	SUS FLOW TO RES	3	12	1	0	9	GPM	5%	SLO	27 01281	1				P	
C	●	H	384	R	SUS FLOW TO NAA CONT	3	12	9	0	9	GPM	5%	SLO	27 01281	1				P	
	●	H	385	R	SUS FLOW FROM V MAN	2	12		0	9	GPM	5%	SLO	27 01281	1				P	
	●	H	386	R	SUS FLOW TO MANIFOLD	3	12	17	0	9	GPM	5%	SLO	27 01281	1				P	
		H	227	X	S TK RESVR PISTON	1	A	13	ON	OFF				17 44900	109		1160	4	P	27-06209
C	●	H	387	X	S ENG CNTL BRACKET	1	13	1	ON	OFF	VDC		STP						P	
C	●	H	388	X	ENG CNTL TO PR LINE	1	13	19	ON	OFF	VDC		STP						P	
C	●	H	389	X	HYD MANIFOLD TO CONE	1	13	35	ON	OFF	VDC		STP						P	
		I			INERTIAL GUIDANCE															
	●	I	313	A	ACCEL XF1 DIRECT	3	C		M12	12	G								P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAW NO NUMBERS
●	I	514	A	ACCEL XF2 DIRECT	3	E		M12	12	6							P	
●	I	516	A	ACCELEROMETER YF1	2	A		M12	12	6							P	
●	I	517	A	ACCELEROMETER ZF1	3	13		M12	12	6							P	
●	I	519	A	ACCELEROMETER YF2	2	C		M12	12	6							P	
●	I	520	A	ACCELEROMETER ZF2	3	A		M12	12	6							P	
	I	549	D	PITCH SERVO ERROR	2	6		M4.6	4.1	MIN		20					P	
	I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20						
	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	DEG		100					P	
	I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
	.	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
	I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100					M	
●	I	552	D	REDNOT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35					P	
●	I	552	D	REDNOT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
●	I	505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
●	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
●	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
●	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	
●	I	509	H	AZN ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
●	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
●	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
●	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
	I	572	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
●	I	531	T	GYRO 1	1	12	1	M6.3	6.3	DEG		SLO					P	
●	I	532	T	GYRO 2	1	12	3	M6.3	6.3	DEG		SLO					P	
	I	533	T	BINNACLE	1	12	5	0	100	DEG		SLO					P	
	I	534	T	ANALOG SIG CONVERTER	1	12	11	0	100	DEG		SLO					P	
	I	535	T	COMPUTER	1	12	19	0	90	DEG		SLO					P	
●	I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUBCARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
●	I	528	V	YAW STEERING SIG	2	11	13	M3	3	VAC		1					M	
	I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
	I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6					M	
●	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
●	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
	I	540	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		SLO					P	
	I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
	I	543	V	COMPUTER M56 PSUP	3	Y		M59	0	VDC		SLO					P	
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
	I	545	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
	I	547	V	COMPUTER 4 PSUP	1	13	43	0	6	VDC		SLO					P	
	I	548	V	COMPUTER 38 PSUP	1	12	41	0	42	VDC		SLO					P	
	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	
	I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
●	I	510	U	ELAPSED TIME	1	E	9	0	450	SEC		10K					P	
	I	581	U	TIME T	2	8	5					BLP					P	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	521	X	VERN ENGINE COF SIG	2	6	5	OFF	ON			BLP					P	
	I	522	X	S ENGINE COF SIG	1	12	44	OFF	ON			STP					P	
	I	522	X	S ENGINE COF SIG	2	9	5	OFF	ON			BLP					P	
	I	523	X	56V COF RELAYS	2	10	5	OFF	ON			BLP					P	
	I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
	I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
	I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
	I	537	X	COMPUTER REDUNDANCY	2	7	5	OFF	ON			BLP					P	
	I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	M			MISCELLANEOUS														
	M	143	D	BOOSTER SEPARATION	3	7		0	5	IN	.25	[illegible]	[illegible]	[illegible]	[illegible]	1	P	27-11725
	M	52	X	COMAX VALVE COMMAND	1	4	23	OFF	ON	VDC		STP					P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
	M	78	X	STROBE LIGHT OCCUR	1	C	95	OFF	ON	VDC		STP					P	
	M	84	X	B STGG LATCH MSW Q1	3	8		OFF	ON				87 44900 109		1145	1	P	27-11797
	M	85	X	B STGG LATCH MSW Q2	3	8		OFF	ON				87 44900 109		1145	1	P	27-11797
	M	86	X	B STGG LATCH MSW Q3	3	8		OFF	ON				87 44900 109		1145	1	P	27-11797
	M	87	X	B STGG LATCH MSW Q4	3	8		OFF	ON				87 44900 109		1145	1	P	27-11797
	P			PROPULSION SYSTEM														
	P	799	A	LO2 LINE LAT ACCEL	2	13		M60	60	G	3%	100	27 01277 5	494	1111	1	P	27-11787
	P	83	B	B2 PUMP SPEED	1	2		5680	6400	RPM	60	SLO	27 01267 1	49N	1198	2	P	27-11722
	P	84	B	B1 PUMP SPEED	2	2		5680	6400	RPM	60	SLO	27 01267 1	52N	1198	4	P	27-11721
	P	349	B	S PUMP SPEED	1	3		9.9	11.2	KPM	.1	SLO	27 01264 3	15N	1234	3	P	27-11720
	P	528	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG	2	SLO	NAA				P	
	P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG	2	SLO	NAA		1205	3	P	27-17564
	P	6	P	S THRUST CHAMBER	2	5	1	0	1000	PIA	16	150	7 01731 5	5688	1235	1	P	27-11720
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA	40	SLO	7 01720 3	62995	1208	1	P	27-11651
	P	28	P	V1 THRUST CHAMBER			43	0	400	PIA	10	SLO	7 01737 3	1033	1127	4	P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA	10	SLO	7 01737 3	1369	1127	2	P	27-11699
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA	40	SLO	7 01720 3	6292	1208	1	P	27-11651
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA	40	15	7 01731 5	5225	1144	3	P	27-11722
	P	39	P	B FUEL PUMP DISCH	2	E	21	0	1000	PIA	40	15	7 01731 5	6476	1173	1	P	27-11721
	P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA	3.8	SLO	27 01243 9	D0079	1235	1	P	27-11720
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA	18	15	7 01731 1	6628	1244	2	P	27-11684
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA	18	15	7 01731 1	6161	1244	1	P	27-11684
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA	15	SLO	7 01731 5	6615	1244	1	P	27-11684
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA	15	SLO	7 01731 5	66038	1244	2	P	27-11684
	P	155	P	B1 GAS GEN COMBUSTOR	1	12	23	0	1000	PIA	25	SLO	7 01731 5	6611	1173	1	P	27-11721
	P	164	P	B2 GAS GEN COMBUSTOR	1	12	33	0	1000	PIA	25	SLO	7 01731 5	6435	1144	3	P	27-11722
	P	279	P	B2 LO2 PR LUB OIL MN	2	11	43	0	125	PIA	5	SLO	27 01243 9	00044	1144	3	P	27-11722
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA	38	15	7 01731 7	6134	1235	1	P	27-11720

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA	25	SLO	7 01731 5	5452	1235	1	P	27-11720
	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA	38	SLO	7 01731 7	6121	1235	1	P	27-11720
	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA	15	SLO	7 01731 5	5446	1235	1	P	27-11720
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIG	5	SLO	27 01243 9	0050F	1175	1	P	27-11721
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	R53	1197	3	P	27-11720
	P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 11736 1	129			P	27-25278
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 11736 3	27L			P	27-25280
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 11736 5	61L			P	27-25281
	P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	P	547	X	B1 CUTOFF RELAY	1	7	5	0	28	VDC		STP					P	
	P	548	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP					P	
	S			AUTOPILOT SYSTEM														
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG	.2	5		34			P	
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG	.2	5		34			P	
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG	.2	5		34			P	
	S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG	.5	10	7 01680 7	13276	1212	1	P	
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG	.5	30	7 01680 7	1527	1212	1	M	27-11721
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG	.5	10	7 01680 7	892	1212	2	P	27-11722
	S	205	D	B1 YAW	1	6		M5	5	DEG	.5	10	7 01680 7	899	1212	4	P	
	S	205	D	B1 YAW	2	11	5	M5	5	DEG	.5	30	7 01680 7	899	1212	4	M	27-11721
	S	206	D	B2 YAW	2	E	19	M5	5	DEG	.5	10	7 01680 7	914	1212	2	P	27-11722
	S	222	D	V1 PITCH	2	E	7	0	50	DEG	3	10	7 01414 1	10867	1123	4	P	27-11699
	S	223	D	V2 PITCH	2	E	3	0	50	DEG	3	10	7 01414 1	08373	1123	2	P	27-11699
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG	7	10	27 01205 1	144	1129	4	P	27-11699
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG	7	10	27 01205 1	208	1129	2	P	27-11699
	S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG	.3	6	7 01680 9	938	1210	1	P	
	S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG	.3	30	7 01680 9	938	1210	1	M	27-11720
	S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG	.3	6	7 01680 3	1034	1210	2	P	
	S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG	.3	30	7 01680 3	1034	1210	2	M	27-11720

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
@	S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S	.3	15		34			P	
@	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S	.3	15		34			M	
@	S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S	.3	15		34			P	
@	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S	.3	15		34			M	
@	S	54	R	YAW RATE GYRO SIG	1	8		M6	6	D/S	.3	15		34			P	
@	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S	.3	15		34			M	
	S	248	X	A/P PG SWITCH 17	1	13	3	OFF	ON	VDC		STP					P	
	T			TELEMETRY SYSTEM														
C	T	2	T	B1 T/C REFER JUNCT	1	11	1	0	200	DGF			27 01287 1				P	
C	T	3	T	S T/C REFER JUNCT	1	11	39	0	200	DGF			27 01287 1				P	
C	T	105	T	BOOSTER T/C REFER	1	11	19	0	200	DGF			27 01287 1				P	
C	T	162	T	V T/C REFER JUNCT	1	11	23	0	200	DGF			27 01287 1				P	
	U			PROPELLANT UTILIZ														
	U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID		SLO	27 01280 1	4760	948	3	P	27-11683
	U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01280 1	301	948	3	P	27-11683
	U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC	.5	SLO		5			P	
	Y			PAYLOAD SYSTEM														
	Y	1	X	SEPARATION SIG	1	A	19	OFF	ON	MC		STP					P	
	Z			AZUSA														
	Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM	50	3		10001			P	

THIS MATERIAL CONTAINS INFORMATION [illegible] MEANING OF THE ESPIONAGE LAWS, TITLE 18 U.S.C. SECTIONS 793 AND 794. THE [illegible] OF WHICH IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW

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SECTION 9

MISSILE INSTRUMENTATION BY CHANNEL

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by channel.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

UNITS OF FUNCTION

A	P	29	P	V2 THRUST CHAMBER	1	11	5	0	400	PIA		SLO	7 01737 1		1128	2		P	27-11614
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA		SLO	7 01731 3		1243	4		P	27-16500
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA		SLO	7 01723 13		925	Y		P	27-11609
A	P	671	T	TH SECT AMB QUAD 4	1	11	11	100	700	DGF		SLO	7 01684 9		1230	4		P	27-11599

MEASUREMENT NUMBER

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number for the applicable measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE-CONT.	1	0	0											
	E	50	Q	400 CYCLE AC PWRSUP	1	1		370	430	CPS	4	SLO		5			P	
	P	83	B	B2 PUMP SPEED	1	2		5680	6400	RPM	60	SLO	27 01267 1	49N	1198	2	P	27-11722
	P	349	B	S PUMP SPEED	1	3		9.9	11.2	KPM	.1	SLO	27 01266 3	15N	1234	3	P	27-11720
	S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG	.3	6	7 01680 9	938	1210	1	P	27-11720
	S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG	.3	6	7 01680 3	1034	1210	2	P	27-11720
	S	205	D	B1 YAW	1	6		M5	5	DEG	.5	10	7 01680 7	899	1212	4	P	27-11721
	D	1	V	RSC CUTOFF OUTPUT	1	6	S	0	31	V	3	BLP					M	
	S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG	.5	10	7 01680 7	13278	1212	1	P	27-11721
	P	547	X	B1 CUTOFF RELAY	1	7	S	0	28	VDC		STP					P	
•	S	56	R	YAW RATE GYRO SIG	1	8		M6	6	D/S	.3	15		36			P	
•	S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S	.3	15		36			P	
•	S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S	.3	15		36			P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OF FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 2.5 RPS	1	11	0											
C	T	2	T	B1 T/C REFER JUNCT	1	11	1	0	200	DGF			27 01287 1				P	
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E	.45	SLO					P	
	F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01684 3	50125	1205	4	P	27-11682
	G	584	C	MOD III MAGNETRON	1	11	7	0	0.9	MA	.03	SLO					P	
	P	580	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	R53	1197	3	P	27-11720
	F	146	T	LO2 PRESS ORFC IN	1	11	11	0	500	DGF		SLO	7 01684 3	50119	1121	3	P	27-11732
	A	638	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3	320A	1223	2	P	27-11793
	A	488	T	AMB F STG VLV Q3	1	11	15	M100	300	DGF		SLO	27 01287 3	24674	1173	3	P	27-11793
	G	503	V	MOD III PB AGC	1	11	17	0	M4.8	VDC	.15	SLO					P	
C	T	103	T	BOOSTER T/C REFER	1	11	19	0	200	DGF			27 01287 1				P	
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
C	T	162	T	V T/C REFER JUNCT	1	11	23	0	200	DGF			27 01287 1				P	
				100% CALIB	1	11	25											
				0% CALIB	1	11	27											
				0% CALIB	1	11	29											
	A	640	T	FWD SIDE A FRAME Q4	1	11	31	M100	300	DGF		SLO	27 01287 3	23933	1205	4	P	27-11793
	A	645	T	AMB FWD B1 Q4	1	11	33	M100	300	DGF		SLO	27 01287 3	24676	1196	2	P	27-11794
	F	247	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01633 5A	60107	1221	4	P	27-11682
	A	641	T	AMB . STG VLV Q1	1	11	37	M100	300	DGF		SLO	27 01287 3	24678	1174	1	P	27-11793
C	T	3	T	S T/C REFER JUNCT	1	11	39	0	200	DGF			27 01287 1				P	
	A	642	T	AMB NEAR B2 GG Q3	1	11	41	M100	300	DGF		SLO	27 01287 3	23929	1196	3	P	27-11794
	F	17	T	FUEL PRESS ORIFIC IN	1	11	43	0	500	DGF	12	SLO	7 01684 3	50120	1120	1	P	27-11732
	A	639	T	AMB JET RAIL Q4	1	11	45	M100	300	DGF		SLO	27 01287 3	327A	1178	4	P	27-11793
	G	503	V	CONNECTED TO 1 11 17	1	11	47											
A	G	281	V	RB REFLECT SET	1	11	49	M2.5	0	VDC		SLO					P	
	G	579	V	CONNECTED TO 1 11 21	1	11	51											
A	G	302	C	PB-IP MODULATOR AVG	1	11	53	M1.7	0	VDC		SLO					P	
				SYNC & 100% CALIB	1	11	55											
				CONNECTED TO 1 11 55	1	11	56											
				CONNECTED TO 1 11 56	1	11	57											
				CONNECTED TO 1 11 57	1	11	58											
				CONNECTED TO 1 11 58	1	11	59											

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MISSILE 12E REPORT NO. AZC-27-059-12 DATE 21 FEB 61 PAGE 3

	Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No.	Quadrant	Card Code	Drawing Numbers
					COMM. RATE 5 RPS	1	12	0											
	●	I	531	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	
	●	I	532	T	GYRO 2	1	12	3	M6.3	6.3	DGC		SLO					P	
		I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
A		G	588	P	WAVEGUIDE PRESS 1	1	12	7	0	15	PIA		SLO	7 01225 1	197	1113	1	P	27-11883
A		G	589	P	WAVEGUIDE PRESS 2	1	12	9	0	15	PIA		SLO	7 01225 1	234	1113	1	P	27-11883
		I	540	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		SLO					P	
		I	534	I	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
		I	572	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
		F	145	P	S CIL HE BTL DISCH	1	12	17	0	3500	PIA	175	SLO	7 01720 5	5657	1213	2	P	27-11650
		I	535	I	COMPUTER	1	12	19	0	50	DGC		SLO					P	
		I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
		F	155	P	B1 GAS GEN COMBUSTOR	1	12	23	0	1000	PIA	25	SLO	7 01731 5	6611	1173	1	P	27-11721
					100% CALIB	1	12	25											
					0% CALIB	1	12	27											
					50% CALIB	1	12	29											
C	●	H	398	P	NAA HYD ACCUM GAS	1	12	31	0	3500	PIA	5%	SLO	7 01720 5				P	
		P	184	P	B2 GAS GEN COMBUSTON	1	12	33	0	1000	PIA	25	SLO	7 01731 5	6435	1144	3	P	27-11722
		I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
		P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG	2	SLO	NAA		1205	3	P	27-17564
		I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
		I	548	V	COMPUTER 38 PSUP	1	12	41	0	42	VDC		SLO					P	
		H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA	140	SLO	7 01731 9	5129	1173	1	P	27-11721
		I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
		I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
		I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
		I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
		I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
		H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA	45	SLO	7 01720 5	5665	1213	2	P	27-11650
		F	244	P	B TANK HE BOTTLES HI	1	12	53	0	350	PIA	105	SLO	7 01720 5	5452	1187	4	P	27-11682
					SYNC & 100% CALIB	1	12	55											
					CONNECTED TO 1 12 55	1	12	56											
					CONNECTED TO 1 12 56	1	12	57											
					CONNECTED TO 1 12 57	1	12	58											
					CONNECTED TO 1 12 56	1	12	59											

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 12E REPORT NO. AZC-27-059-12 DATE 21 FEB 61 PAGE 4

	VEHICLE (1)	SYSTEM (2)	MEASUREMENT NUMBER (3)	TYPE MEASUREMENT (4)	DESCRIPTION (5)	TELEMETER NO. (6)	SUB-CARRIER NO. (7)	COMMUTATOR PIN NO. (8)	MEASUREMENT RANGE LOW (9)	MEASUREMENT RANGE HIGH (9)	UNITS OF FUNCTION (10)	ACCURACY (11)	RATE OF CHANGE OR FREQUENCY OF FUNCTION (12)	TYPE OF TRANSDUCER (13)	SERIAL NO. (14)	STATION NO. (15)	QUADRANT (16)	CARD CODE (17)	DRAWING NUMBERS
					COMM. RATE 5 RPS	1	13	0											
C		H	387	X	S ENG CNTL BRACKET	1	13	1	ON	OFF	VDC		STP					P	
		S	248	X	A/P PG SWITCH 17	1	13	3	OFF	ON	VDC		STP					P	
		P	548	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP					P	
		D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC	3	STP					P	
		P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
		E	28	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC	1.0	SLO		5			P	
		P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA	40	SLO	7 01720 3	6292	1208	1	P	27-11651
		P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA	15	SLO	7 01731 5	66038	1244	2	P	27-11684
		P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA	3.8	SLO	27 01243 9	D0079	1235	1	P	27-11720
C		H	388	X	ENG CNTL TO PR LINE	1	13	19	ON	OFF	VDC		STP					P	
		U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01280 1	301	948	3	P	27-11683
		E	53	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC	1.0	SLO		5			P	
					100% CALIB	1	13	25											
					0% CALIB	1	13	27											
					50% CALIB	1	13	29											
		U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID		SLO	27 01280 1	4760	948	3	P	27-11683
		F	1	P	LO2 TANK HELIUM	1	13	33	0	45	PIA	1.8	SLO	7 01723 11	5029	484	3	P	27-11679
C		H	389	X	HYD MANIFOLD TO CONE	1	13	35	ON	OFF	VDC		STP					P	
		F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA	3	SLO	7 01723 13	V3217	948	3	P	27-11583
		P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA	15	SLO	7 01731 5	6615	1244	1	P	27-11684
		I	345	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
		I	547	V	COMPUTER 4 PSUP	1	13	43	0	6	VDC		SLO					P	
		F	114	P	LO2 PRESS REG INLET	1	13	45	0	3000	PIA		SLO	7 01731 9	6667	1187	4	P	27-11682
		P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA	40	SLO	7 017[illegible] 3	62995	1208	1	P	27-11651
		P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA	15	SLO	7 01731 5	5446	1235	1	P	27-11720
		F	36	P	FUEL PRESS ORIFIC DP	1	13	51	0	7	PID	.3	80	27 01280 3	1715P	1127	1	P	27-11732
		E	53	V	CONNECTED TO 1 13 23	1	13	53											
					SYNC & 100% CALIB	1	13	55											
					CONNECTED TO 1 13 55	1	13	56											
					CONNECTED TO 1 13 56	1	13	57											
					CONNECTED TO 1 13 57	1	13	58											
					CONNECTED TO 1 13 58	1	13	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 10 RPS	1	A	0											
	E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC	1.0	SLO		5			P	
	H	225	P	B TK RESVR GAS	1	A	3	0	200	PIG	3%	SLO	27 01243 7	16086	1173.4		P	27 1815
	D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	100K	UV	5%	SLO		157			P	
	U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC	.5	SLO		5			P	
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG	.2	5		34			P	
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG	.2	5		34			P	
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG	.2	5		34			P	
	H	227	X	S TK RESVR PISTON	1	A	15	ON	OFF				87 44900 109		1160.4		P	27-86209
	Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM	5%	3		10001			P	
	Y	1	X	SEPARATION SIG	1	A	19	OFF	ON	MC		STP					P	
C	H	212	P	VERNIER RETURN	1	A	21	0	200	PIA	5%	SLO	27 01243 11				P	
	M	32	X	CONAX VALVE COMMAND	1	A	23	OFF	ON	VDC		STP					P	
				100% CALIB	1	A	25											
				0% CALIB	1	A	27											
				50% CALIB	1	A	29											
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA	25	S	7 01731 5	5452	1235,1		P	27-11720
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA	10	SLO	7 11737 3	1033	1127.4		P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA	10	SLO	7 01737 3	1369	1127.2		P	27-11699
	U	91	V	CONNECTED TO 1 A 7	1	A	37											
	S	61	D	CONNECTED TO 1 A 9	1	A	39											
	S	62	D	CONNECTED TO 1 A 11	1	A	41											
	S	63	D	CONNECTED TO 1 A 13	1	A	43											
	P	528	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG	2	SLO	NAA				P	
	Z	3	E	CONNECTED TO 1 A 17	1	A	47											
	F	147	P	LO2 PRESS ORFC DP	1	A	49	0	5	PID	.1	SLO	27 01280 1	297	1127.3		P	27-11732
	F	65	P	LO2 TK HE LIN @ ORFC	1	A	51	0	45	PIA	.5	SLO	27 01243 5	2299	1127.4		P	27-11732
C	H	191	P	S HI PR TO MANIFOLD	1	A	53	0	3500	PIA	5%	SLO	7 01720 5				P	
				SYNC & 100% CALIB	1	A	55											
				CONNECTED TO 1 A 55	1	A	56											
				CONNECTED TO 1 A 56	1	A	57											
				CONNECTED TO 1 A 57	1	A	58											
				CONNECTED TO 1 A 58	1	A	59											

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MISSILE 12E REPORT NO AZC-27-059-12 DATE 21 FEB 61 PAGE 3

	Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Subcarrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
					COMM. RATE 1/8 RPS	1	C	0											
A		G	197	0	RB-IR RADIAL	1	C	1			G		1K					P	
		G	197	0	CONNECTED TO 1 C 1	1	C	2											
		G	197	0	CONNECTED TO 1 C 2	1	C	3											
		G	197	0	CONNECTED TO 1 C 3	1	C	4											
		G	197	0	CONNECTED TO 1 C 4	1	C	5											
		G	197	0	CONNECTED TO 1 C 5	1	C	6											
		G	197	0	CONNECTED TO 1 C 6	1	C	7											
		G	197	0	CONNECTED TO 1 C 7	1	C	9											
		G	197	0	CONNECTED TO 1 C 9	1	C	10											
		G	197	0	CONNECTED TO 1 C 10	1	C	11											
		G	197	0	CONNECTED TO 1 C 11	1	C	12											
		G	197	0	CONNECTED TO 1 C 12	1	C	13											
		G	197	0	CONNECTED TO 1 C 13	1	C	14											
		G	197	0	CONNECTED TO 1 C 14	1	C	15											
A		G	94	0	BOOM ANTENNA	1	C	17			G		1K					P	
		G	94	0	CONNECTED TO 1 C 17	1	C	18											
		G	94	0	CONNECTED TO 1 C 18	1	C	19											
		G	94	0	CONNECTED TO 1 C 19	1	C	20											
		G	94	0	CONNECTED TO 1 C 20	1	C	21											
		G	94	0	CONNECTED TO 1 C 21	1	C	22											
		G	94	0	CONNECTED TO 1 C 22	1	C	23											
		G	94	0	CONNECTED TO 1 C 23	1	C	25											
		G	94	0	CONNECTED TO 1 C 25	1	C	26											
		G	94	0	CONNECTED TO 1 C 26	1	C	27											
		G	94	0	CONNECTED TO 1 C 27	1	C	28											
		G	94	0	CONNECTED TO 1 C 28	1	C	29											
		G	94	0	CONNECTED TO 1 C 29	1	C	30											
		G	94	0	CONNECTED TO 1 C 30	1	C	31											
[illegible]		G	587	0	POD WAVEGUIDE	1	C	33			G		1K					P	
		G	587	0	CONNECTED TO 1 C 33	1	C	34											
		G	587	0	CONNECTED TO 1 C 34	1	C	35											
		G	[illegible]	0	CONNECTED TO 1 C 35	1	C	36											

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System	Measurement Number	Measurement	Description	Telemeter No	Sub Carrier No	Commutator Pin No	Range Low	Range High	Units of Function	Card Code
G	587	0	CONNECTED TO 1 C 36	1	C	37				
G	587	0	CONNECTED TO 1 C 37	1	C	38				
G	587	0	CONNECTED TO 1 C 38	1	C	39				
G	587	0	CONNECTED TO 1 C 39	1	C	41				
G	587	0	CONNECTED TO 1 C 41	1	C	42				
G	587	0	CONNECTED TO 1 C 42	1	C	43				
G	587	0	CONNECTED TO 1 C 43	1	C	44				
G	587	0	CONNECTED TO 1 C 44	1	C	45				
G	587	0	CONNECTED TO 1 C 45	1	C	46				
G	587	0	CONNECTED TO 1 C 46	1	C	47				
			0% CALIB	1	C	49				
			50% CALIB	1	C	51				
			100% CALIB	1	C	53				
			SYNC & 100% CALIB	1	C	55				
			CONNECTED TO 1 C 55	1	C	56				
			CONNECTED TO 1 C 56	1	C	57				
			CONNECTED TO 1 C 57	1	C	58				
			CONNECTED TO 1 C 58	1	C	59				
M	78		STROBE LIGHT OCCUR	1	C	95	OFF	ON	VDC STP	P

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				DIGITAL CHANNEL	1	E	O											
@	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
@	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
@	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
@	I	510	W	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
@	I	505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
@	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
@	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
@	I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
@	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 12E REPORT NO AZC-27-059-12 DATE 21 FEB 61 PAGE 9

	VEHICLE SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE, FREQUENCY OR FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUANTITY	CARD CODE	DRAWING NUMBERS
				COMM. RATE CONT.	2	0	0											
					2	1												
	P	84	B	B1 PUMP SPEED	2	2		5680	6400	RPM	60	SLO	27 01267 1	52N	1198	4	P	27-11721
	I	29	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
@	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
@	I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	
	I	549	D	PITCH SERVO ERROR	2	6		M4.6	4.1	MIN		20					P	
	I	521	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP					P	
@	I	552	D	REDNDT GYRO PICK-OFF	2	7		M2	2.7	MIN		35					P	
	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	
	I	581	W	TIME T	2	8	S					BLP					P	
	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	DEG		100					P	
	I	522	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP					P	
	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
	I	523	X	S&V COF RELAYS	2	10	S	OFF	ON			BLP					P	

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	VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
					COMM. RATE 2.5 RPS	2	11	0											
		S	236	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG	.3	30	7 01680 9	938	1210	1	M	27-11720
		S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG	.3	30	7 01680 3	1034	1210	2	M	27-11720
		S	205	D	B1 YAW	2	11	5	M5	5	DEG	.5	30	7 01680 7	899	1212	4	M	27-11721
		S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG	.5	30	7 01680 7	1327	1212	1	M	27-11721
	●	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S	.3	15		34			M	
	●	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S	.3	15		34			M	
	●	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S	.3	15		34			M	
		I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6					M	
	●	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
	●	I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10					M	
		I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20					M	
	●	I	552	D	REDNDT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
					100% CALIB	2	11	25											
					0% CALIB	2	11	27											
					50% CALIB	2	11	29											
		I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
		I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
		I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100					M	
		F	212	P	FUEL PRESS ORIFIC IN	2	11	[illegible]	40	70	[illegible]	2.1	SLO	27 0.243 7	16095	1127	2	P	27-117[illegible]
		H	224	P	B HYD SYS LO PRESS	2	11	39	0	200	PIG	3%	SLO	27 01243 11	9L309	1175	4	P	27-11815
		H	219	P	S TK RESVR GAS	2	11	41	0	200	PIG	3%	SLO	27 01243 7	16092	1206	1	P	27-11651
		P	279	P	B2 LO2 PR LUB OIL MN	2	11	43	0	125	PIA	5	SLO	27 01243 9	00049	1144	3	P	27-11722
		P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIG	5	SLO	27 01243 9	0050F	1173	1	P	27-11721
		P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA	3%	SLO	7 01731 7	6121	1235	1	P	27-11720
C		A	5	P	V2 CLAMSHELL INNER	2	11	49	0	15	PIA	5%	SLO	55 01107 41				P	
C	@	H	52	P	S HYD ACCUMULATOR	2	11	51	0	3500	PIA	5%	SLO	7 01720 5				P	
C	●	H	379	P	SUS ROD LINE HI PR	2	11	53	0	3500	PIA	5%	SLO	7 01720 5				P	
					SYNC & 100% CALIB	2	11	55											
					CONNECTED TO 2 11 55	2	11	56											
					CONNECTED TO 2 11 56	2	11	57											
					CONNECTED TO 2 11 57	2	11	58											
					CONNECTED TO 2 11 58	2	11	59											

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 12E REPORT NO AZC-27-059-12 DATE 21 FEB 61 PAGE 11

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE CONT.	2	12	0											
●	H	385	R	SUS FLOW FROM V MAN	2	12		0	9	GPM	5%	SLO	27 01281 1				P	
	P	799	A	LO2 LINE LAT ACCEL	2	13		M60	60	G	3%	100	27 01277 5	494	1111	1	P	27-11787
●	I	516	A	ACCELEROMETER YF1	2	A		M12	12	G							P	
●	I	519	A	ACCELEROMETER YF2	2	C		M12	12	G							P	

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE .2E REPORT NO. AZC-27-059-12 DATE 21 FEB 61 PAGE 12

VEHICLE (1)	SYSTEM (2)	MEASUREMENT NUMBER (3)	TYPE MEASUREMENT (4)	DESCRIPTION (5)	TELEMETER NO. (6)	SUB-CARRIER NO. (7)	COMMUTATOR PIN NO. (8)	MEASUREMENT RANGE LOW (9)	MEASUREMENT RANGE HIGH (9)	UNITS OF FUNCTION (10)	ACCURACY (11)	RATE OF CHANGE OR FREQUENCY OF FUNCTION (12)	TYPE OF TRANSDUCER (13)	SERIAL NO. (14)	STATION NO. (15)	QUADRANT (16)	CARD CODE (17)	DRAWING NUMBERS
				COMM. RATE 30 RPS	2	E	0											
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA	16	150	7 01731 5	5688	1235	1	P	27-11720
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA	38	15	7 01731 7	6134	1235	1	P	27-11720
	S	223	D	V2 PITCH	2	E	5	0	50	DEG	3	10	7 01414 1	08323	1123	2	F	27-11699
	S	222	D	V1 PITCH	2	E	7	0	50	DEG	3	10	7 01414 1	10867	1123	4	P	27-11699
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA	18	15	7 01731 1	6161	1244	1	P	27-11684
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA	18	15	7 01731 1	6628	1244	2	P	27-11684
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG	7	10	27 01205 1	144	1129	4	P	27-11699
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG	.5	10	7 01680 7	892	1212	2	P	27-11722
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG	7	10	27 01205 1	208	1129	2	P	27-11699
	S	206	D	B2 YAW	2	E	19	M5	5	DEG	.5	10	7 01680 7	914	1212	2	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	P91	40	15	7 01731 5	4476	1173	1	P	27-11721
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA	40	15	7 01731 5	5225	1144	3	P	27-11722
				100% CALIB	2	E	25											
				0% CALIB	2	E	27											
				50% CALIB	2	E	29											
	P	6	P	CONNECTED TO 2 E 1	2	E	31											
	P	330	P	CONNECTED TO 2 E 3	2	E	33											
	S	223	D	CONNECTED TO 2 E 5	2	E	35											
	S	222	D	CONNECTED TO 2 E 7	2	E	37											
	P	60	P	CONNECTED TO 2 E 9	2	E	39											
	P	59	P	CONNECTED TO 2 E 11	2	E	41											
	S	233	D	CONNECTED TO 2 E 13	2	E	43											
	S	204	D	CONNECTED TO 2 E 15	2	E	45											
	S	234	D	CONNECTED TO 2 E 17	2	E	47											
	S	206	D	CONNECTED TO 2 E 19	2	E	49											
	P	39	P	CONNECTED TO 2 E 21	2	E	51											
	P	38	P	CONNECTED TO 2 E 23	2	E	53											
				SYNC & 100% CALIB	2	E	55											
				CONNECTED TO 2 E 55	2	E	56											
				CONNECTED TO 2 E 56	2	E	57											
				CONNECTED TO 2 E 57	2	E	58											
				CONNECTED TO 2 E 58	2	E	59											
	D	3	X	RSC DESTRUCT OUTPUT	2	E	95	0	30	VDC		5TP					P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 12E REPORT NO. AZC-27-059-12 DATE 21 FEB 61 PAGE 13

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
				COMM. RATE CONT.	3	0	0											
					3	1												
					3	2												
					3	3												
●	H	130	P	S HYD PUMP DISCH	3	4		0	3500	PIA	5%	SLO	7 01720 5				P	
●	H	185	P	S HYD PUMP INLET	3	5		0	200	PIA	5%	SLO	27 01243 11				P	
					3	6												
	M	143	D	BOOSTER SEPARATION	3	7		0	8	IN	.25	14	7 01676 1	LU161	1131	1	P	27-11723
	M	84	X	B STGG LATCH MSW Q1	3	8		OFF	ON				87 44900 109		1145	1	P	
	M	85	X	B STGG LATCH MSW Q2	3	8		OFF	ON				87 44900 109		1145	1	P	
	M	86	X	B STGG LATCH MSW Q3	3	8		OFF	ON				87 44900 109		1145	1	P	
	M	87	X	B STGG LATCH MSW Q4	3	8		OFF	ON				87 44900 109		1145	1	P	27-11797
	I	543	V	COMPUTER M50 PSUP	3	9		M55	0	VDC		SLO					P	

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 12E REPORT NO. AZC-27-059-12 DATE 21 FEB 61 PAGE 14

	1 VEHICLE	2 SYSTEM	3 MEASUREMENT NUMBER	4 TYPE MEASUREMENT	5 DESCRIPTION	6 TELEMETRE NO	7 SUB-CARRIER NO	8 COMMUTATOR PIN NO.	9 MEASUREMENT RANGE LOW	9 MEASUREMENT RANGE HIGH	10 UNITS OF FUNCTION	11 ACCURACY	12 RATE OF CHANGE FREQUENCY OF FUNCTION	13 TYPE OF TRANSDUCER	14 SERIAL NO	15 STATION NO.	16 QUADRANT	17 CARD CODE	DRAWING NUMBERS
					COMM. RATE 2.5 RPS	3	11	0											
		A	285	I	THRUST SECT LITE B1	3	11	1	0	600	FTC			7 01709 1 3		1220	4	P	27-11733
		A	764	I	THRUST SECT LITE B2	3	11	3	0	600	FTC			7 01709 1 3		1220	2	P	27-11733
		P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 11736 3	27L			P	27-25280
		P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 11736 5	61L			P	27-25281
		P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 11736 1	129			P	27-25273
						3	11	11											
C		A	412	T	BLACK CALOR QUAD IV	3	11	13	0	1000	DGF	5%	SLO	27 11912 5				P	
						3	11	15											
C		A	438	T	38 GM CALOR QUAD IV	3	11	17	0	1000	DGF	5%	SLO	27 11912 3				P	
						3	11	19											
C		A	440	T	19 GM CALOR QUAD IV	3	11	21	0	1000	DGF	5%	SLO	27 11912 1				P	
C		A	1	T	V2 FAIRING AMBIENT	3	11	23	0	1000	DGF	5%	SLO	FE/CN				P	
					100% CALIB	3	11	25											
					0% CALIB	3	11	27											
					0% CALIB	3	11	29											
C		A	2	T	V2 CLAMSHELL AMBIENT	3	11	31	0	1000	DGF	5%	SLO	FE/CN				P	
C	ø	A	3	T	V2 CONDUIT	3	11	33	0	1000	DGF	5%	SLO	FE/CN				P	
						3	11	35											
						3	11	37											
C	ø	A	4	T	V2 SERVO ELEC CON	3	11	39	0	1000	DGF	5%	SLO	FE/CN				P	
						3	11	41											
						3	11	43											
						3	11	45											
						3	11	47											
						3	11	49											
						3	11	51											
C	ø	A	6	T	ROD PANEL AMBIENT	3	11	53	0	1000	DGF	5%	SLO	FE/CN				P	
					SYC & 100% CALIB	3	11	55											
					CONNECTED TO 3 11 55	3	11	56											
					CONNECTED TO 3 11 56	3	11	57											
					CONNECTED TO 3 11 57	3	11	58											
					CONNECTED TO 3 11 58	3	11	59											

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 12E REPORT NO. AZC-27-059-12 DATE 21 FEB 61 PAGE 15

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 1/8 RPS	3	12	0											
C	H	383	R	SUS FLOW TO RES	3	12	1	0	9	GPM	5%	SLO	27 01281 1				P	
	H	383	R	CONNECTED TO 3 12 1	3	12	3											
	H	383	R	CONNECTED TO 3 12 3	3	12	5											
	H	383	R	CONNECTED TO 3 12 5	3	12	7											
C	H	384	R	SUS FLOW TO NAA CONT	3	12	9	0	9	GPM	5%	SLO	27 01281 1				P	
	H	384	R	CONNECTED TO 3 12 9	3	12	11											
	H	384	R	CONNECTED TO 3 12 11	3	12	13											
	H	384	R	CONNECTED TO 3 12 13	3	12	15											
C	H	386	R	SUS FLOW TO MANIFOLD	3	12	17	0	9	GPM	5%	SLO	27 01281 1				P	
	H	386	R	CONNECTED TO 3 12 17	3	12	19											
	H	386	R	CONNECTED TO 3 12 19	3	12	21											
	H	386	R	CONNECTED TO 3 12 21	3	12	23											
	H	383	R	CONNECTED TO 3 12 7	3	12	25											
	H	383	R	CONNECTED TO 3 12 25	3	12	27											
	H	383	R	CONNECTED TO 3 12 27	3	12	29											
	H	383	R	CONNECTED TO 3 12 29	3	12	31											
	H	384	R	CONNECTED TO 3 12 15	3	12	33											
	H	384	R	CONNECTED TO 3 12 33	3	12	35											
	H	384	R	CONNECTED TO 3 12 35	3	12	37											
	H	384	R	CONNECTED TO 3 12 37	3	12	39											
	H	386	R	CONNECTED TO 3 12 23	3	12	41											
	H	386	R	CONNECTED TO 3 12 41	3	12	43											
	H	386	R	CONNECTED TO 3 12 43	3	12	45											
	H	386	R	CONNECTED TO 3 12 45	3	12	47											
				0% CALIB	3	12	49											
				50% CALIB	3	12	51											
				100% CALIB	3	12	53											
				SYNC & 100% CALIB	3	12	55											
				CONNECTED TO 3 12 55	3	12	56											
				CONNECTED TO 3 12 56	3	12	57											
				CONNECTED TO 3 12 57	3	12	58											
				CONNECTED TO 3 12 58	3	12	59											

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 12E REPORT NO. AZC-27-059-12 DATE 21 FEB 61 PAGE 16

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE CONT.	3	13	0											
@	1	517	A	ACCELEROMETER ZF1	3	13		M12	12	G							P	
@	1	520	A	ACCELEROMETER ZF2	3	A		M12	12	G							P	
@	1	513	A	ACCEL XF1 DIRECT	3	C		M12	12	G							P	
@	1	514	A	ACCEL XF2 DIRECT	3	E		M12	12	G							P	

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SECTION 10

LANDLINE INSTRUMENTATION

The Landline Instrumentation presented in this section contains the latest available characteristics of the individual measurements. In addition the type of recordings indicated.

VEHICLE

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

FREQUENCY RESPONSE

Denotes the frequency response requirements in cps of the instrumentation system for the measurement.

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated description of the measurement.

UNITS OF FUNCTION

TRANSDUCER SERIAL NUMBER

A	F	1125	P	B CTL PNEU REG OUT	S	200	800	PIA	[illegible]	SLO	7 01731 3	2841	1243	4	27-16500
A	F	1104	P	FACILITY GN_2 SUPPLY	S	0	2400	PIG	48	SLO					
A	F	[illegible]	P	ST PNEU REG OUT	S	0	800	PIA	10	SLO	7 01720 1		1223	2	27-16505
A	G	1036	[illegible]	PITCH ANALOG	D	M30	30	VDC	0.2	SLO					27-0001-3

MEASUREMENT NUMBER

ACCURACY REQUIREMENT

Present in units of the function measured.

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

RECORDER ASSIGNMENT

This code defines the method to be utilized to record the measurement. A double letter here indicates that this measurement will be recorded on two different types of recorders.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

NOTE: For a more detailed explanation [illegible] H/M Code Key [illegible]

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 12E L/L REPORT NO. AZC-27-059-12 DATE 21 FEB 61 PAGE 1

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card	Drawing Numbers
	A			AIRFRAME														
A	A	1806	T	ROT INVTR B2 POD Q2	MP			30	240	DGF	4%	SLO	FE/CN				P	
A	A	1807	T	ROT INVTR B2 POD Q2	MP			30	240	DGF	4%	SLO	FE/CN				P	
A	A	1808	T	ROT INVTR B2 POD Q2	MP			30	240	DGF	4%	SLO	FE/CN				P	
A	A	1809	T	ROT INVTR B2 POD Q2	MP			30	240	DGF	4%	SLO	FE/CN				P	
A	A	1810	T	ROT INVTR B2 POD Q2	MP			30	240	DGF	4%	SLO	FE/CN				P	
A	A	1815	T	ROT INVTR B2 POD Q2	MP			30	240	DGF	4%	SLO	FE/CN				P	
A	A	1816	T	ROT INVTR B2 POD Q2	MP			30	240	DGF	4%	SLO	FE/CN				P	
A	A	1817	T	ROT INVTR B2 POD Q2	MP			30	240	[illegible]	4%	SLO	FE/CN				P	
A	A	1818	T	ROT INVTR B2 POD Q2	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1819	T	ROT INVTR B2 POD Q2	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1820	T	ROT INVTR B2 POD Q2	MP			[illegible]	100	DGF	4%	SLO	FE/CN				P	
A	A	1821	T	ROT INVTR B2 POD Q2	MP			30	100	DGF	4%	SLO	FE/CN				P	
A	A	1822	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1823	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1824	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1901	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1902	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1903	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1904	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1905	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1906	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1907	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1908	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1909	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1910	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1911	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1912	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	[illegible]	T	GE PB B1 POD Q4	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1937	T	TLM #2 B POD Q1	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1938	T	TLM #2 B1 POD Q1	MP			30	180	DGF	4%	SLO	FE/CN				P	
	A	1939	T	TLM #2 B1 POD Q1	MP			30	100	DGF	4%	SLO	FE/CN				P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No		Card Code	Drawing Numbers
A	A	1940	T	TLM #2 B1 POD Q1	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1941	T	TLM #2 B1 POD Q1	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1942	T	TLM #2 B1 POD Q1	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1943	T	TLM #2 B1 POD Q1	MP			30	180	DGF	4%	SLO	FE/CN				P	
A	A	1944	T	TLM #2 B1 POD Q1	MP			30	180	DGF	4%	SLO	FE/CN				P	
	D			RANGE SAFETY SYSTEM														
	D	5142	V	RSC #1 BAT DC		M											P	
	D	5143	V	RSC #2 BAT DC		M											P	
	D	5140	W	RSC #1 TOTAL TIMER		M		0	1000	HR							P	
	D	5141	W	RSC #2 TOTAL TIMER		M		0	1000	HR							P	
	D	5150	W	RSC #1 & 2 BATTERY		M		0	1000	HR							P	
	E			ELECTRICAL POWER SYS														
	E	1043	C	CRITICAL POWER A				0	800	A	8	4					P	
	E	1044	C	CRITICAL POWER B				0	800	A	8	4					P	
	E	1045	C	CRITICAL POWER C				0	800	A	8	4					P	
	E	5064	C	MISSILE DC AMPS		M		0	200	AMP							P	
	E	5068	C	EMERGENCY GENERATOR		M		0	200	AMP							P	
	E	5005	Q	INVERTER FREQUENCY		M		[illegible]	404	CPS							P	
	E	5029	Q	MISSILE EXT PHASE A		M		396	404	CPS							P	
	E	5031	Q	PHASE A EXT @ MSL		M		396	404	CPS							P	
	E	5003	V	BATTERY OUTPUT		M		0	40	VDC							P	
	E	5006	V	INVERTER PHASE A		M		110	120	VAC							P	
	E	5022	V	MISSILE AC EXT @ MSL		M		110	120	VAC							P	
	E	5023	V	MISSILE EXTERNAL AC		M		110	120	VAC							P	
	E	5030	V	MISSILE DC EXT @ MSL		M		0	40	VDC								
	E	5065	V	MISSILE EXTERNAL DC		M		0	40	VDC							P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
	E	5109	W	MAIN MSL BATT TIMER		M											P	
	E	5110	W	INVERTER TIMER		M											P	
	F			PNEUMATIC SYSTEM														
	F	1309	D	LO2 ULLAGE VENT VLV		R		OPEN	CLS			SLO					P	
	F	1001	P	LO2 TANK HELIUM		O		0	50	PIG	1	SLO	7 01723 11	5029	484	3	P	27-11679
	F	5001	P	LO2 TANK HELIUM		M		0	30	PIG			27 01243 5	16099	484	3	P	27-11679
	F	1003	P	FUEL TANK HELIUM		O		0	75	PIG	1	SLO	7 01723 13	V3217	948	3	P	27-11683
	F	5003	P	FUEL TANK HELIUM		M		0	75	PIG			27 01243 7	16118	948	3	P	27-11683
	F	5032	P	LN2 PRESSURE		M		0	4000	PIG							P	
	F	5053	P	NORM SUP PRESSURE		M		0	4000	PIG							P	
	F	5054	P	EMERG SUP PRESSURE		M		0	4000	PIG							P	
	F	5116	P	DIFFERENTIAL PRESS		M		0	5	PID							P	
	F	1145	P	S CTL HE BTL DISCH		S		0	3500	PIG	105	SLO	7 01720 5	5657	1213	2	P	27-11650
	F	5145	P	S CTL HE BTL DISCH		M		0	3500	PIG	105	SLO	7 01720 5	5656	1213	2	P	27-11650
	F	1194	P	FACILITY GN2 SUPPLY		S		0	2400	PIG	48	SLO					P	
	F	1246	P	B TANK HE BOTTLES HI		S		0	3500	PIG	65	SLO	7 01720 5	5452	1187	4	P	27-11682
	F	5246	P	B TANK HE BOTTLES HI		M		0	4000	PIG			7 01720 5	5437	1200	4	P	27-11682
	F	1301	P	GND LO2 ULLAGE TANK		S		20	30	PIG	.1	SLO					P	
	F	1302	P	GND FUEL ULLAGE TANK		S		55	65	PIG	.1	SLO					P	
	F	5247	T	BSTR TANK TEMP		M		M80	M380	DGF			7 01633 5B	60107	1221	4	P	27-11682
	H			HYDRAULIC SYSTEM														
●	H	1360	P	HPU SUSTAINER RETURN		G		0	200	PIA	5%	SLO	27 01243 11				P	
	H	1187	X	BSTR OIL EVACUATION		R		OFF	ON	VDC		STP					P	
	H	1188	X	SUST OIL EVACUATION		R		OFF	ON	VDC		STP					P	
	I			INERTIAL GUIDANCE														
●	I	1515	A	ACCELEROMETER X F1				M12	12	G							P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
●	I	1516	A	ACCELEROMEYER Y F1				M12	12	G							P	
●	I	1517	A	ACCELEROMETER Z F1				M12	12	G							P	
●	I	1518	A	ACCELEROMETER X F2				M12	12	G							P	
●	I	1519	A	ACCELEROMETER Y F2				M12	12	G							P	
●	I	1520	A	ACCELEROMETER Z F2				M12	12	G							P	
	I	1591	C	PITCH GYRO TORQUE				M75	75	MA							P	
	I	1592	C	ROLL GYRO TORQUE				M75	75	MA							P	
	I	1593	C	YAW GYRO TORQUE				M75	75	MA							P	
●	I	1594	D	PENDULUM #1 NULL		D	4	M30	30	MA							P	
●	I	1595	D	PENDULUM #2 NULL		D	5	M30	30	MA							P	
●	I	1596	D	OPTIC SIGNAL		D	6	M30	30	MA							P	
●	I	1505	H	COMPUTER POSITION X				0	6K	NM		10K					P	
●	I	1506	H	COMPUTER POSITION Y				M300	500	NM		10K					P	
●	I	1507	H	COMPUTER POSITION Z				0	700	NM		10K					P	
●	I	1508	H	RANGE ERROR FUNCTION				0	6K	NM		10K					P	
●	I	1509	H	AZM ERROR FUNCTION				M300	500	NM		10K					P	
●	I	1502	L	COMPUTER VELOCITY X				0	22K	F/S		10K					P	
●	I	1503	L	COMPUTER VELOCITY Y				0	4K	F/S		10K					P	
●	I	1504	L	COMPUTER VELOCITY Z				0	6K	F/S		10K					P	
●	I	1601	V	400 CPS REFERENCE													P	
	I	1606	V	COMPUTER RESET		0		0	10	VDC	15%						P	
●	I	1510	W	ELAPSED TIME													P	
	I	1521	X	VERN ENGINE COF SIG				ON	OFF								P	
	I	1522	X	S ENGINE COF SIG				ON	OFF								P	
	I	1570	X	STAGING SIG				ON	OFF								P	
	L			LAUNCHER														

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CALIB CODE	DRAWING NUMBERS
	L	1398	D	MSL VS DISCON Q1 & 2				M1.0	2.0	IN	0.1	50					P	
	L	1399	D	MSL VS DISCON Q3 & 4				M1.0	2.0	IN	0.1	50					P	
C	L	1446	D	2 INCH MOTION Q1		0		0	3	IN	2%	SLO	87 93900 037				P	
C	L	1447	D	2 INCH MOTION Q2		0		0	3	IN	2%	SLO	87 93900 037				P	
C	L	1448	D	2 INCH MOTION Q3		0		0	3	IN	2%	SLO	87 93900 037				P	
C	L	1449	D	2 INCH MOTION Q4		0		0	3	IN	2%	SLO	87 93900 037				P	
A	L	1452	P	PORT MANO				0	30	INW	.2						P	
A	L	1453	P	PORT MANO				0	30	INW	.2						P	
A	L	1454	P	VENTUR PITOT TUBE S1				0	30	INW	.2						P	
A	L	1455	P	VENTUR PITOT TUBE S2				0	30	INW	.2						P	
A	L	1456	P	VENTUR PITOT TUBE S3				0	30	INW	.2						P	
A	L	1457	P	VENTUR PITOT TUBE S4				0	30	INW	.2						P	
A	L	1458	P	VENTUR PITOT TUBE S5				0	30	INW	.2						P	
A	L	1462	P	VENTUR PITOT TUBE T1				0	30	INW	.2						P	
A	L	1463	P	VENTUR PITOT TUBE T2				0	30	INW	.2						P	
A	L	1464	P	VENTUR PITOT TUBE T3				0	30	INW	.2						P	
A	L	1465	P	VENTUR PITOT TUBE T4				0	30	INW	.2						P	
A	L	1466	P	VENTUR PITOT TUBE T5				0	30	INW	.2						P	
A	L	1450	T	PORT THERM 1				40	60	DGF	.5						P	
A	L	1451	T	PORT THERM 2				40	60	DGF	.5						P	
A	L	1459	T	PORT THERM 3				40	60	DGF	.5						P	
A	L	1460	T	PORT THERM 4				40	60	DGF	.5						P	
A	L	1461	T	PORT THERM 5				40	60	DGF	.5						P	
	M			MISCELLANEOUS														
	M	5144	V	STROBELIGHT BATTERY		M											P	
	M	1090	X	MSL ONE INCH MOTION		R		OFF	ON								P	
	M			FACILITIES AND GSE														
	M	5362	D	36 INCH WATER VALVE		M											P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE FREQUENCY OR FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
	N	1330	P	SLUG CH LO2 DISCH		S		0	500	PIG		SLO					P	
	N	1334	T	SLUG CH LO2 DISCH		S		M250	M325	DGF		SLO					P	
	N	1335	X	SLG CH LO2 DISCH VLV		R		ON	OFF			STP					P	
	N	1336	X	SLG CH LO2 VENT VLV		R		ON	OFF			STP					P	
	N	1337	X	SLG CH LO2 INLET VLV		R		ON	OFF			STP					P	
	N	1338	X	SLG CH LN2 INLET VLV		R		ON	OFF			STP					P	
	N	1339	X	SLG CH GN2 INLET VLV		R		ON	OFF			STP					P	
	P			PROPULSION SYSTEM														
	P	1083	B	B2 PUMP SPEED		F		5680	6400	RPM	60	SLO	27 01267 1	49N	1198	2	P	27-11722
	P	1084	B	B1 PUMP SPEED		F		5680	6400	RPM	60	SLO	27 01267 1	52N	1198	4	P	27-11721
	P	5242	B	PUMP LC SPEED		M		0	100	PCT							P	
	P	1349	B	S PUMP SPEED		F		9.9	11.2	KPM	.1	SLO	27 01264 5	58N	1234	3	P	27-11720
A	P	5685	M	FUEL IN MISSILE		M		0	10K	GAL							P	
	P	1439	O	S NAA RCC ACCEL		F		M80	80	G	5	2KC					P	
	P	1492	O	B1 NAA RCC ACCEL		F		M80	80	G	5	2KC					P	
	P	1493	O	B2 NAA RCC ACCEL		F		M80	80	G	5	2KC					P	
	P	5373	P	LO2 STORAGE TANK		M		0	50	PIG	.6	SLO					P	
	P	5430	P	FUEL STORAGE TANK		M		0	10	PIG	.6	SLO					P	
	P	1474	P	V CTL PRESS REG OUT		S		200	800	PIG	.6	SLO	7 01731 3	5558	1208	1	P	27-11651
	P	1020	T	B1 LOX PUMP INLET		S		M325	M275	DGF	1	SLO	7 01649 9		1182	4	P	27-11721
	P	1054	T	B2 LOX PUMP INLET		S		M325	M275	DGF	1	SLO	7 01649 9		1189	2	P	27-11722
	P	1325	T	ENG COMP AMBIENT		S		M325	500	DGF	3	SLO	FE/CN		1208	1	P	27-11651
	P	1710	T	SE ENVIRONMENT		S		M325	500	DGF		SLO	CR/CN		1235	3	P	27-17540
	P	1711	T	B1 NACELLE AMBIENT		S		M325	500	DGF		SLO	CR/CN		1204	4	P	27-17544

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
	P	1712	T	B2 NACELLE AMBIENT	S			M325	500	DGF		SLO	CR/CN		1204	2	P	27-17546
	P	5849	W	LO2 SLUG XFER & FIRE	M												P	
	P	1155	X	OBSERVER CUTOFF	R			OFF	ON	VDC		STP					P	
	P	1161	X	TCC START SWITCH	R			OFF	ON	VDC		STP					P	
	P	1164	X	TCC ENGINE COF SW	R			OFF	ON	VDC		STP					P	
	P	1225	X	ENGINE CONTROL READY	R			OFF	ON	VDC		STP					P	
	P	1226	X	PNEUMATICS CUTOFF	R			OFF	ON	VDC		STP					P	
	P	1227	X	LO2 DOME PURGE	R			OFF	ON	VDC		STP					P	
	P	1228	X	IGNITER FUEL PURGE	R			OFF	ON	VDC		STP					P	
	P	1229	X	LO2 HIGH TOPPING	R			OFF	ON	VDC		STP					P	
	P	1230	X	LO2 LOW TOPPING	R			OFF	ON	VDC		STP					P	
	P	1231	X	LO2 100% SLUG CON	R			OFF	ON	VDC		STP					P	
	P	1347	X	S CUTOFF RELAY	R			OFF	ON	VDC		STP					P	
	P	1544	X	VERNIER CONTROL	R			OFF	ON	VDC		STP					P	
	P	1545	X	S IGN STAGE CONTROL	R			OFF	ON	VDC		STP					P	
	P	1546	X	B2 CUTOFF RELAY	R			OFF	ON	VDC		STP					P	
	P	1547	X	B1 CUTOFF RELAY	R			OFF	ON	VDC		STP					P	
	P	1548	X	COMPLETE COF RELAY	R			OFF	ON	VDC		STP					P	
	P	1549	X	IGNITION START	R			OFF	ON	VDC		STP					P	
	P	1593	X	VERNIER CUTOFF RELAY	R			OFF	ON	VDC		STP	PEN 18				P	
	P	1688	X	VERNIER ENG PURGE	R			OFF	ON	VDC		STP	PEN 37				P	
	P	1785	X	B SECONDARY SHUTDOWN	R			OFF	ON	VDC		STP					P	
	S			AUTOPILOT SYSTEM														
	S	5358	D	ROLL PROGRAM READOUT	M												P	
	S	1048	V	PROGRAMMER PITCH SIG	D			0	2.7	VAC	.2	SLO					P	
	S	1049	V	PROGRAMMER ROLL SIG	D			0	30	VAC	3	STP					P	
	S	1107	V	B1 PCM ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	
	S	1108	V	B2 PCM ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	

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	Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
		S	1113	V	V1 YAW ACTR FEEDBACK		D		M5	7	VAC	5%	30					P	
		S	1134	V	V2 YAW ACTR FEEDBACK		D		M5	7	VAC	5%	30					P	
		S	1118	V	V2 PCH ACTR FEEDBACK		D		M11	11	VAC	5%	30					P	
		S	1119	V	V1 PCH ACTR FEEDBACK		D		M11	11	VAC	5%	30					P	
		S	1121	V	GYRO TEST SIG		D		M5	5	VAC	.1	STP					P	
		S	1132	V	SERVO TEST SIGNAL		D		M11	11	VAC	5%	30					P	
		S	1128	V	B1 YAW ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
		S	1129	V	B2 YAW ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
		S	1147	V	PITCH GYRO AMP OUT		D		M10	10	VAC	1	30					P	
		S	1148	V	YAW GYRO AMP OUT		D		M10	10	VAC	1	30					P	
		S	1149	V	ROLL GYRO AMP OUT		D		M10	10	VAC	1	30					P	
		S	1216	V	S PCH ACTR FEEDBACK		D		M10	10	VAC	5%	30					P	
		S	1217	V	S YAW ACTR FEEDBACK		D		M10	10	VAC	5%	30					P	
		S	5270	V	FINE HEATER-PITCH		M		0	150	VAC							P	
		S	5271	V	FINE HEATER-YAW		M		0	150	VAC							P	
		S	5272	V	FINE HEATER-ROLL		M		0	150	VAC							P	
		S	5176	W	PROGRAM RUN TIME		M		0	999	SEC							P	
A		S	5282	W	DECADE EVENT TIMER		M		0	10K	SEC							P	
		S	1235	X	PROGRAMMER RUN TIME		R		OFF	ON	VDC		STP					P	
		S	1370	X	STAGING		R		OFF	ON	VDC		STP					P	
		S	1371	X	BOOSTER JETTISON		R		OFF	ON	VDC		STP					P	
		S	1372	X	PRESSURIZE VERN		R		OFF	ON	VDC		STP					P	
		S	1373	X	BOOSTER CUTOFF		R		OFF	ON	VDC		STP					P	
		S	1374	X	SUSTAINER CUTOFF		R		OFF	ON	VDC		STP					P	
		S	1375	X	VSHPS BACK-UP SIGNAL		R		OFF	ON	VDC		STP					P	
		S	1376	X	VERNIER CUTOFF		R		OFF	ON	VDC		STP					P	
		S	1377	X	EJECT RV UMBILICAL		R		OFF	ON	VDC		STP					P	
		S	1378	X	RV JETTISON		R		OFF	ON	VDC		STP					P	
		S	1379	X	FIRE RETRO ROCKETS		R		OFF	ON	VDC		STP					P	
		T			TELEMETERING SYSTEM														

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Vehicle System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
T	5140	V	TLM #1 BAT DC		M											P	
T	5141	V	TLM #1 EXTERNAL DC		M											P	
T	5144	V	TLM #2 BAT DC		M											P	
T	5145	V	TLM #2 EXTERNAL DC		M											P	
T	5146	V	TLM #3 BAT DC		M											P	
T	5147	V	TLM #3 EXTERNAL DC		M											P	
T	5156	V	TLM 1 FIL INT DC		M											P	
T	5157	V	TLM 1 FIL EXT DC		M											P	
T	5158	V	TLM 2 FIL INT DC		M											P	
T	5159	V	TLM 2 FIL EXT DC		M											P	
T	5160	V	TLM 3 FIL INT DC		M											P	
T	5161	V	TLM 3 FIL EXT DC		M											P	
T	5150	W	TLM #1 TOTAL		M		0	1000	MR							P	
T	5151	W	TLM #2 TOTAL		M		0	1000	MR							P	
T	5152	W	TLM #3 TOTAL		M		0	1000	MR							P	
T	5153	W	TLM #1 BAT TIMER		M											P	
T	5154	W	TLM #2 BAT TIMER		M											P	
T	5155	W	TLM #1 BATTERY		M		0	60	MIN							P	
U			PROPELLANT UTILIZ														
U	1091	V	ERROR RATIO DEMOD OP		S		M20	20	VDC	.5	20					P	
U	1200	X	LO2 100% SLUG COF-1		R		OFF	ON	VDC		STP					P	
U	1201	X	LO2 TOPG HI CTL-1		R		OFF	ON	VDC		STP					P	
U	1202	X	LO2 TOPG LO CTL-1		R		OFF	ON	VDC		STP					P	
U	1203	X	LO2 95% RAPID LOAD-1		R		OFF	ON	VDC		STP					P	
U	1204	X	FUEL 100% SEC CTL		R		OFF	ON	VDC		STP					P	
U	1205	X	FUEL 100% PRI CTL		R		OFF	ON	VDC		STP					P	
U	1206	X	FUEL 95% SEC CTL		R		OFF	ON	VDC		STP					P	
U	1207	X	FUEL 95% PRI CTL		R		OFF	ON	VDC		STP					P	
U	1208	X	LO2 100% SLUG COF-2		R		OFF	ON	VDC		STP					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Number
U		1209	X	LO2 TOPG HI CTL-2		R		OFF	ON	VDC		STP					P	
U		1210	X	LO2 TOPG LO CTL-2		R		OFF	ON	VDC		STP					P	
U		1211	X	LO2 95% RAPID LOAD-2		R		OFF	ON	VDC		STP					P	

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CONVAIR (ASTRONAUTICS) DIVISION
GENERAL DYNAMICS CORPORATION

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INSTRUMENTATION CONFIGURATION

SERIES E ARTICLE 13

AMR

PREPARED BY TEST PLANNING

CO-ORDINATED BY W. S. Becker
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Chief - Field Test Engineering

GD

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REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
A	27 FEB'61	WSB	ADDITIONS:	4-1 thru 4-8
			A1T, A2T, A3T, A4T, A409T, A439T,	
			A443T, F1309D, F1194P, F1301P, F1302P,	
			G3020, G940, G1970, G5870, G588P,	
			G589P, G281V, H130P, H185P, H191P,	
			H212P, H398P, H383R, H384R, H385R,	
			H386R, H316T, H317T, H387X, H388X,	
			H389X, H1360P, H1187X, H1188X,	
			I1606V, N1356X, N1932X, N1933X,	
			N1979X, P14390, P14520, P14530,	
			P1020T, P1054T, P12254X, P1229X,	
			P1230X, P1231X, S385V, S359X, S1370X,	
			S1371X, S1372X, 1373X, S1374X, S1375X,	
			S1376X, S1377X, S1378X, S1379X,	
			T2T, T3T, T162T, T103T,	
A	27 FEB'61	WSB	DELETIONS:	4-1 thru 4-8
			FM2[illegible]P, H315P, N1314T, P1010P,	
			P1011P, P1232P, P1465P, P1709T,	
			P1713T, P1714T, S1049V, Z2E	
			WB [illegible] HRM [illegible]	

FOREWORD

This report has been published in accordance with contractual requirements as cited in Convair-Astronautics Report ZM-7-289. It describes the instrumentation released for Missile 13-E as of 27 February 1961. A

Information presented here will be used by Air Force, Associate Contractors, Design, Operation, and Field Test Groups. Measurement modification will either originate in the Instrumentation Section of the Test Planning Group or will be submitted as a recommendation to this group.

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SUMMARY

The instrumentation configuration for this missile has been established through a study of program test objectives, systems analysis, and operating considerations. A discussion of missile instrumentation and associated characteristics has been summarized in Report AZC-27-059. For a detailed description of the various missile systems, test objectives, and general test program see Report AE60-0436.

To clarify specific measurements, instrumentation location schematics have been included in Report AZC-27-059, Section 7.

A list of special instrumentation for 13E has been included on page 4 - of this revision.

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REASONS FOR REVISION "A" CHANGES

INTRODUCTION

Due to the inflight failures of missiles 3E, 4E, and 8E, additional instrumentation has also been added to missile 13E to continue the evaluation of the airborne hydraulic system, the effects of radiant heating, and aerodynamic heating of V-2 electrical components.

I. The bracket which mounts the sustainer engine control package to the engine has been strengthened by Rocketdyne to preclude any inflight failures. Break wires attached to the sustainer engine control package (H387X, H388X) and main hydraulic distribution manifold (H389X) will indicate mounting bracket failures. A measurement recommended by Rocketdyne for analysis of the sustainer engine control package performance has also been added, Accumulator gas pressure (H398P).
Measurements of flow to the sustainer engine control (H384R), to the high pressure distribution manifold (H386R), to the hydraulic reservoir via the high pressure relief valve (H383R), and from the vernier distribution manifold (H385R) will provide data on overall system performance as well as isolate the location of a failure in the high pressure portion of the system. A low pressure measurement in the vernier return line (H212P) in conjunction with the Hydraulic Pumping Unit Sustainer Return (H1360P) pressure will provide additional data for a pressure survey in this area of the system. Data for malfunction analysis of the high pressure system will also be provided by pump discharge (H130P), and line (H191P) pressure measurements. (See Figure 1).
A check valve has been installed in the sustainer high pressure line upstream of

the staging disconnect. This will prevent loss of hydraulic fluid in the event that the disconnect couplings become damaged. A heat shield has been added over the rise--off disconnect panel and sliding poppets have been added to the disconnects themselves to protect them from radiant heating. In order to obtain information on the amount of heating of the rise-off disconnect panel, thermocouples have been installed at the booster (H317T) and sustainer (H316T) high pressure rise-off disconnects.

In addition to the foregoing, Sustainer Hydraulic Pump Inlet Pressure (H185P) will be installed. This measurement was planned previously as part of the overall instrumentation package for missile 13E. (See Figure 1).

Sequence measurements in the Hydraulic Pumping Unit will provide data on booster (H1187X) and Sustainer (H1188X) system hydraulic fluid evacuation. (See Figure 1).

The extensiometers are located on the upper pedestal supports on the launcher.

II. In addition to the thermocouples, three (3) calcrimeters have been placed on the aft heat shield on 13E. See Figure 2 for approximate locations:

A 409T	Black Calor QI
A 439T	38 GM Calor QI
A 443T	19 GM Calor QIV

The CV-A calorimeters are clustered in groups of three to give the heat transfer coefficient along with readings of convection and radiation quantities. The 19 gram gold calorimeter provides a measure of convection heat while the black calorimeter will provide total heating information. The third calorimeter in the group, 38 grams, combined with the other two calorimeters will give the heat transfer coefficient. All calorimeters are mounted facing aft and approximately 3 inches in diameter for each calorimeter.

Due to the danger of soot or other elements plating the surface of the relatively large calorimeter clusters during launch period and producing incorrect data, two nine (9) inch pie tins will be placed over the clusters as covers. The pie tins will be mechanically removed after the first ten (10) feet of flight. Camera coverage will substantiate the successful removal of the two pie tins.

III. High temperatures in the conduit, electrical connectors, and the fairings around the vernier engines have been considered as a possible cause for short circuiting. To accurately determine the inflight temperature enviornment at these locations the following measurements will be made on 12E.

A 1 T	V2 FAIRING AMBIENT (Inside),
A 2 T	V2 CLAMSHELL AMBIENT (Inside),
A 3 T	V2 CONDUIT (Near Center), and
A 4 T	V SERVO ELECTRICAL CONNECTOR (Surface).

Thermal input will be a combination of aerodynamics, engine plume, and electrical component heating. The clamshell fairing, mounted on the side of the vernier engine, has several large openings which facilitate gimbaling.

Temperatures of thermocouple reference junctions (T2T, T3T, T103T, T162T) will be made to insure accurate data from all thermocouples. These reference junctions are used with measurements made on the booster, sustainer, and vernier engine areas respectively.

IV. Redesign of the cooling distribution systems for ARMA B1 and B2 pods requires data provided by the following additional instrumentation: 12 temperature measurements on the ROTARY INVERTER in the B2 POD, QUADRANT 2; 16 temperature measurements on the GE PULSE BEACON in the B1 POD, QUADRANT 4; 8 temperature measurements on the NO. 2 TELEMETRY PACKAGE, B1 POD, QUADRANT 1. At the launcher, 10 pressure measurements have been added for PITOT TUBES, and 5 temperature measurements for PORTABLE

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THERMOMETERS. There are 2 additional pressure measurements (L1452P and L1453P) for the PORTABLE MANOMETERS.

V. To provide higher quality data during the critical portions of launch, and supply booster engine rough combustion data for the first 15 feet of missile travel, 2 accelerometer measurements will be monitored via trailing wire umbilical.

MEAS	DESCRIPTION
P14390	NAA RC ACCEL
P14520	B1 NAA RCC ACCEL
P14530	B2 NAA RCC ACCEL

VI. The booster LOX pump inlet temperature measurements have been added as operational redlines.

ADD

P 1020 T B1 LOX PUMP INLET

P 1054 T B2 LOX PUMP INLET

VII. This measurement will indicate the number of guidance computer off-on cycles and help to establish the computer run time when combined with measurement I 1510 W.

ADD

I 1606 V COMPUTER RESET

VIII. The following sequence measurements will be used for flight test and systems validation by providing time-sequence of operation of these functions during ground checkout.

ADD

P 1225 X ENGINE CONTROL READY

P 1229 X LO2 HIGH TOPPING

[redacted]

MEAS. NO.	DESCRIPTION	CHANNEL
P 1230 X	LO2 LOW TOPPING	
P 1231 X	100% SLUG COM	

IX The following measurements were added to provide a record for proof of proper sequence operation or data for failure analysis. These measurements will be made during the Integrated Systems Test of the A/P programmer.

ADD

S 1370 X	STAGING	
S 1371 X	BOOSTER JETTISON	
S 1372 X	PRESSURIZE	
S 1373 X	BOOSTER CUTOFF	
S 1374 X	SUSTAINER CUTOFF	
S 1375 X	VSHPS BACK-UP SIGNAL	
S 1376 X	VERNIER CUTOFF	
S 1377 X	EJECT RV UMBILICAL	
S 1378 X	RV JETTISON	
S 1379 X	FIRE RETRO ROCKETS	

X. The following measurements will be used to determine the cause of Impact Predictor drop out experienced on the G.E-I.P. system on "D" AIG flights.

ADD

G 281 Y	RB REFLECT SPT	1.11.49
G 302 C	RB-IP MODULATOR AVG	1.11.53
G 588 P	WAVEGUIDE PRESS 1	1.12.[illegible]

[redacted]

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MEAS. NO.	DESCRIPTION	CHANNEL
G 589 P	WAVEGUIDE PRESS 2	1.12.9
G 197 0	RB--IP RADIAL	1.C.1 thru 15
G 940	BOOM ANTENNA	1.C.17 thru 31
G 587 0	POD WAVEGUIDE	1.C.33 thru 47

XI. A backup booster staging acceleration switch, located in the pod, will be flown open-loop on this missile. This is being done to gather data to evaluate this system since it will operate closed-loop for Agena B, Midas/Samos and Centaur missiles. The switch will supply a backup staging signal, insuring staging in the event that the normal staging discrete from guidance is not supplied to the programmer.

The acceleration switch is essentially a spring-mass system, having fluid damping and utilizing a differential transformer for signal pick-off. This signal is filtered and supplied to an electronic switching circuit which closes a relay at a preset acceleration level. The accelerometer signal voltage (S385V) and switch activation (S359X) are monitored for evaluation purposes.

XII. Four measurements have been added to determine that proper sequencing of the LOX slug transfer valves occurs.

MEAS.	DESCRIPTION
ADD	
N 1356 X	SLG CHB LO2 LOW LEVEL
N 1932 X	LO2 TPNG VLV CLOSED
N 1933 X	LO2 TPNG VLV OPEN
N [illegible]9 X	PRESS VLV CLOSED

[redacted]

XII Operating measurement F1194P has been added to ascertain the accuracy of the GN2 supply pressure during countdown and hold.

XIII These measurements, applicable only on FRF missiles, have been deleted on 13E.

MEAS. DELETE	DESCRIPTION
P 1010 P	B 1 LUBE OIL INJ MAN
P 1011 P	B 2 LUBE OIL INJ MAN
P 1232 P	S LO2 SEAL CAV TY
P 1465 P	S LO PR LUBE OIL MAN
P 1227 X	LOX DOME PURGE
P 1228 X	IGNITER FUEL PURGE
P 1785 X	B SECONDARY SHUTDOWN
P 1226 X	PNEUMATICS CUTOFF

XIV There is no sustainer [illegible] tank pressurization bottle on E series missiles, therefore the following measurement, FM [illegible] P, S TANK He BOTTLE HI, has been deleted.

XV Due to complexity in making and calibrating measurement [illegible]2E, KLYSTRON PW OUTPUT, it has been deleted.

XVI The Roll program is accomplished by ARMA signal, which function is monitored by measurement I529V. Therefore S 1049 V is not required.

XVII Measurement H 315 [illegible] has been deleted because it is a duplication of the new measurement H 185 F.

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XVIII. There is no further test data need on LOX slug transfer units at AMR.

Therefore N 1314 T SLUG CHG LO2 DISC is deleted.

SPECIAL 13E INSTRUMENTATION LIST

MEAS. NO.	DESCRIPTION	RANGE	TRANSDUCER TYPE
A 1 T	V2 FAIRING AMBIENT	0-1000 DGF	Fe/Cn TC
A 2 T	V2 CLAMSHELL AMB	0-1000 DGF	Fe/Cn TC
A 3 T	V2 CONDUIT	0-1000 DGF	Fe/Cn TC
A 4 T	V2 SERVO ELEC CON	0-1000 DGF	Fe/Cn TC
A 409 T	BLACK CALOR QI	0-1000 DGF	27-11912-5
A 439-T	38 GM CALOR QI	0-1000 DGF	27-11912-3
A 443 T	19 GM CALOR QI	0-1000 DGF	27-11912-1
F 1194 P	FACILITY GN2 SUPPLY	0-2500 PIA	
G 302 C	PT-IP MODULATOR AVG	M1.7-0 VDC	
G 94 O	BOOM ANTENNA		
G 197 O	RB-IP RADIAL		
G 587 O	POD WAVEGUIDE		
G 588 P	WAVEGUIDE PRESSURE 1	0-20 PIA	
G 58[illegible] P	WAVEGUIDE PRESSURE 2	0-20-PIA	
G 281 V	RB REFLECT DET	M 2.5-0 VDC	
H 130 P	S HYD PUMP DISCH	0-3500 PIA	7-01720-5
H 185 P	S HYD PUMP INLET	0-200 PIA	27-01234-11
H 191 P	S HIGH PP TO MAN	0-3500 PIA	7-01720-5
H 212 P	VERNIER RETURN	0-200 PIA	27-01243-11
H 1360 P	HPU SUSTAINER RETURN	0-200 PIA	27-01243-11
H 398 P	NAA HYD ACCUM GAS	0-3500 PIA	7-01720-5
H 383 R	SUS FLOW TO RES	0-9 GPM	27-01281-1
H 384 R	SUS FLOW TO NAA CONT	0-9 GPM	27-01281-1
H 385 R	SUS FLOW FROM V MAN	0-9 GPM	27-01281-1
H 386 R	SUS FLOW TO MAN	0-9 GPM	27-01281-1
H 316 T	ROD PANEL SUS IN	0-1000 DGF	Cr/Cn TC
H 317 T	ROD PANEL BOOSTER IN	0-1000 DGF	Cr/Cn TC
H 1187 X	BSTF OIL EVACUATION	OFF-ON VDC	
H 1188 X	SUS OIL EVACUATION	OFF-ON VDC	
H 387 X	S ENG CNTL BRACKET	ON-OFF VDC	
H 388 X	ENG CNTL TO PR LINE	ON-OFF VDC	
H 389 X	HYD MANIFOLD TO CONE	ON-OFF VDC	
I 1606 V	COMPUTER RESET		
N 1356 X	SLG CH LOX LOW LEVEL	ON-OFF	
N 1932 X	LOX TPNG VLV CLOSED	ON-OFF	
N 1933 X	LOX TPNG VLV OPEN	ON-OFF	
N 1979 X	PRESS VLV CLOSED	ON-OFF	
P 1439 0	S NAA RCC ACCEL	M80-80	
P 14520	B 1 NAA RCC ACCEL	M80-80	
P 1453 0	B 2 NAA RCC ACCEL	M80-80	
P 1020 T	B 1 LOX PUMP INLET	M325-M275	
P 1054 T	B 2 LOX PUMP INLET	M325-M275	

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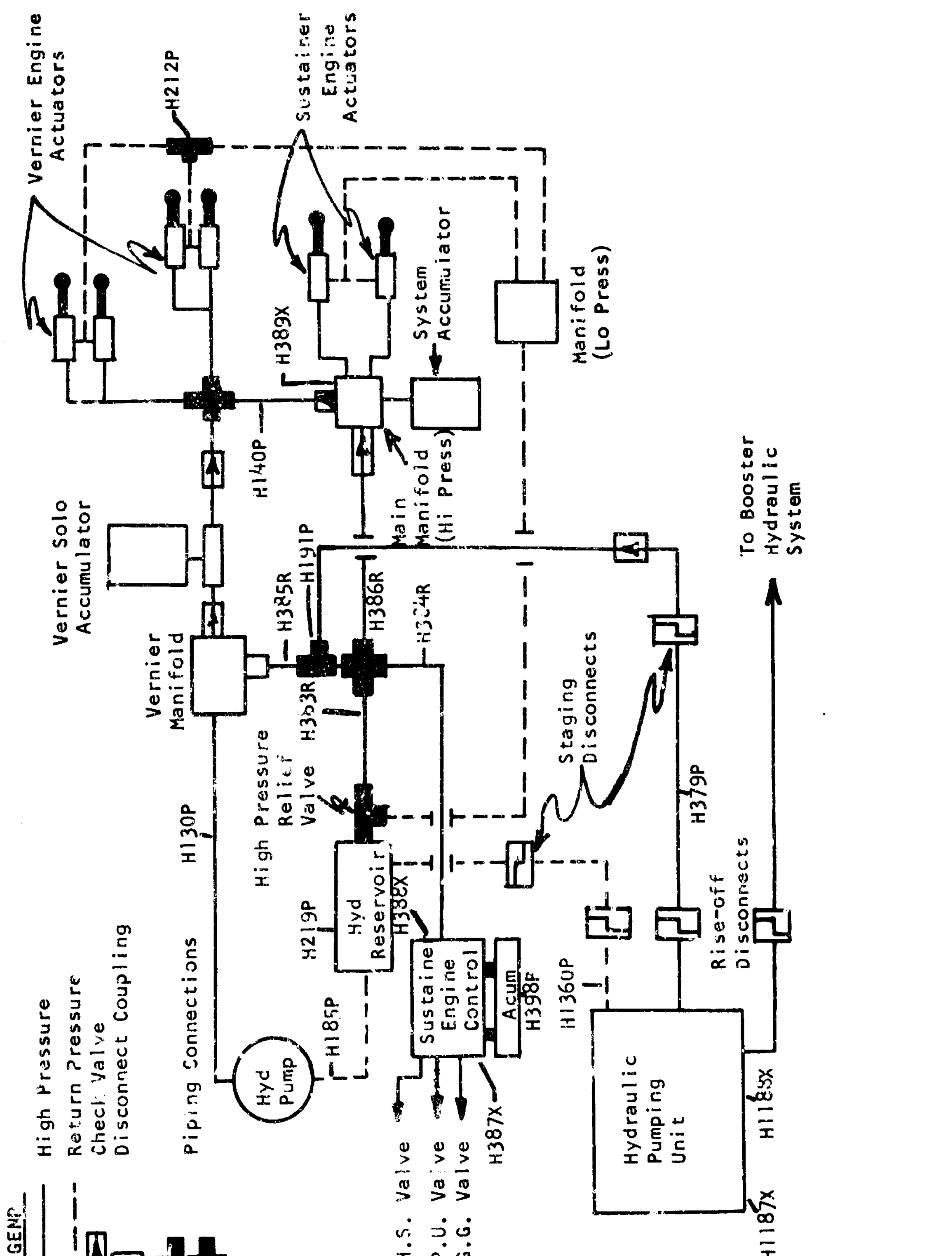
MEAS. NO.	DESCRIPTION	RANGE	TRANSDUCER TYPE
P 1225 X	ENGINE CONTROL RELAY	OFF-ON VDC	
P 1229 X	LOX HIGH TOPPING	OFF-ON VDC	
P 1230 X	LOX LOW TOPPING	OFF-ON VDC	
P 1231 X	PNEUMATICS CUTOFF	OFF-ON VDC	
S 385 V	ACCEL 400 CYCLE CONT	0-11 VAC	
S 359 X	BOOSTER STAGING B/U	OFF-ON VDC	
S 1370 X	STAGING	OFF-ON VDC	
S 1371 X	BOOSTER JETTISON	OFF-ON VDC	
S 1372 X	PRESSURIZE VERN TANK	OFF-ON VDC	
S 1373 X	BOOSTER CUTOFF	OFF-ON VDC	
S 1374 X	SUSTAINER CUTOFF	OFF-ON VDC	
S 1375 X	VSHPS BACK-UP SIGNAL	OFF-ON VDC	
S 1376 X	VERNIER CUTOFF	OFF-ON VDC	
S 1377 X	EJECT RV UMBILICAL	OFF-ON VDC	
S 1378 X	RV JETTISON	OFF-ON VDC	
S 1379 X	FIRE RETROROCKETS	OFF-ON VDC	
T 2 T	B1 T/C REFER JUNCT	0-200 DGF	27-01287-1
T 3 T	S T/C REFER JUNCT	0-200 DGF	27-01287-1
T 103 T	BOOSTER T/C REF	0-200 DGF	27-01287-1
T 162 T	V T/G REFER JUNCT	0-200 DGF	27-01287-1



VERNIER/SUSTAINER
HYDRAULIC SYSTEM

[redacted]

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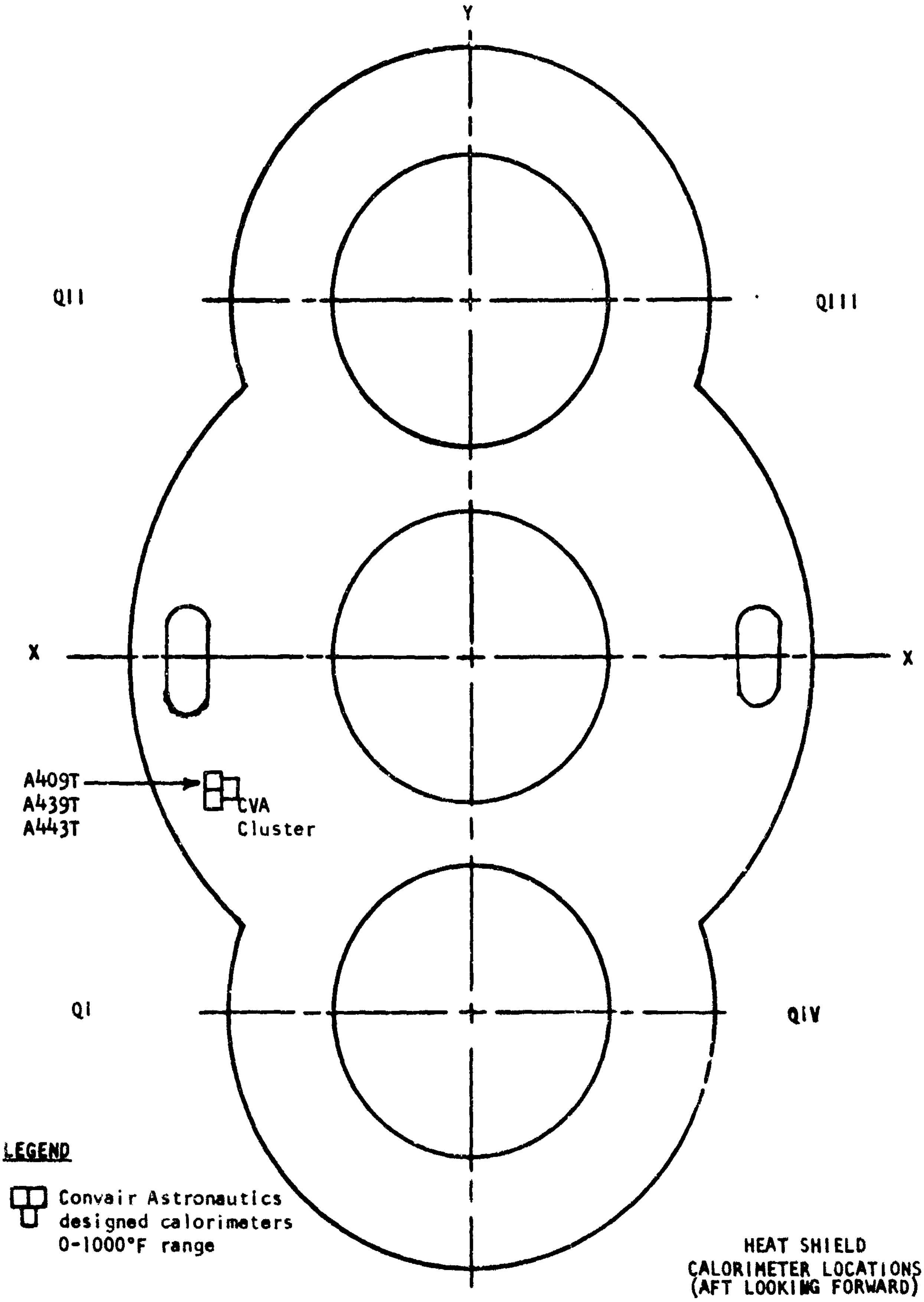

HEAT SHIELD
CALORIMETER LOCATIONS
(AFT LOOKING FORWARD)

[redacted]

[redacted]

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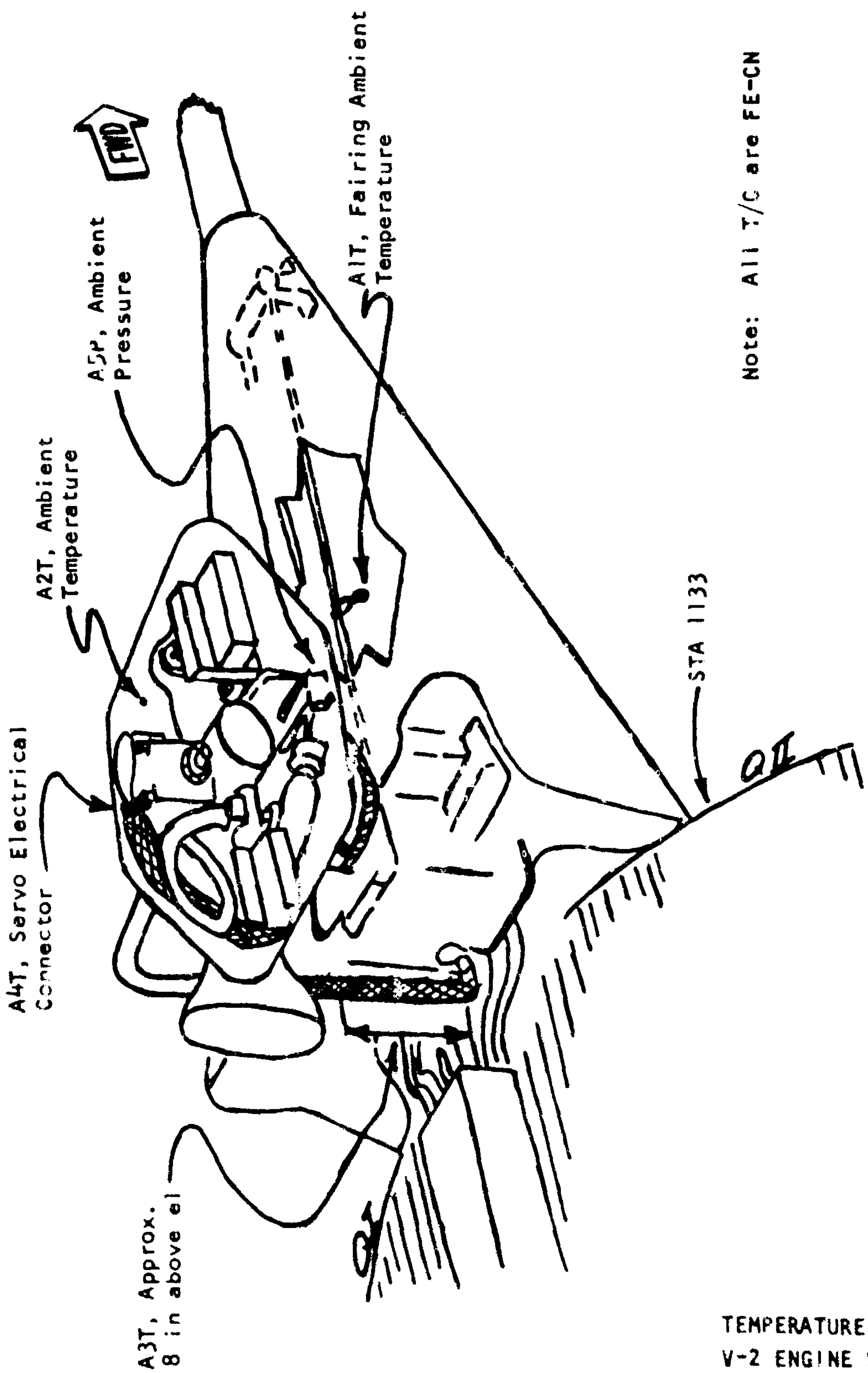

TEMPERATURE STUDY
V-2 ENGINE SYSTEM

SECTION 8

MISSILE INSTRUMENTATION BY SYSTEM

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by system.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

UNITS OF FUNCTION

INSTALLATION DETAILS

Drawing Numbers or Mechanical Installation Drawings.

A	F	1	P	LO_2 TANK HELIUM	1	11	35	0	45	PIA	SLO	7 01723	11		480	2		P	27-11608
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA	SLO	7 01723	13		925	Y		P	27-11609
A	F	125	P	[illegible] CTL PNEU REG OUT	1	11	7	0	1000	PIA	SLO	7 01731	3		1243	4		P	27-16500
A	F	260	P	F TANK HE BOTTLES LO	1	11	17	15	415	PIA	SLO	7 01727	1		1238	1		P	27-11600
A	F	261	P	S TANK HE BOTTLE LO	1	11	21	15	415	PIA	SLO	7 01727	1		1223	2		P	27-16505

MEASUREMENT NUMBER

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number assignment for the applicable measurement.

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E   REPORT NO AZC-27-059-13   DATE 22 JUN 60   PAGE 1

Vehicle System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change, Frequency or Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
A			AIRFRAME														
A	638	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3				P	27-11793
D			RANGE SAFETY SYSTEM														
D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC		STP					P	
D	1	V	RSC CUTOFF OUTPUT	1	6	5	0	31	VDC		BLP					M	
D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	100K	UV		SLO					P	
D	3	X	RSC DESTRUCT OUTPUT	2	E	95	0	30	VDC		STP					P	
E			ELECTRICAL POWER SYS														
E	50	Q	400 CYCLE AC PWRSUP	1	1		370	430	CPS		SLO					P	
E	28	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC		SLO					P	
E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC		SLO					P	
E	53	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC		SLO					P	
F			PNEUMATIC SYSTEM														
F	1	P	LO2 TANK HELIUM	1	13	33	0	45	PIA		SLO	7 01723 11		484	3	P	27-11679
F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA		SLO	7 01723 13		948	3	P	27-11683
F	145	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA		SLO	7 01720 5		1213	2	P	27-11690
F	246	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA		SLO	7 01720 5		1187	4	P	27-11682
F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01694 3		1205	4	P	27-11682
F	247	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01633 5		1221	4	P	27-11682
G			RADIO GUIDANCE SYS														
G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA		SLO					P	

[redacted]

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO AZC-27-059-13 DATE 22 JUN 60 PAGE 2

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETRY NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBER
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E		SLO					P	
	G	503	V	MOD III RB AGC	1	11	17	0	M4.8	VDC		SLO					P	
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
	H			HYDRAULIC SYSTEM														
	H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA		SLO	7 01731	9	1173	1	P	27-11721
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA		SLO	7 01720	5	1213	2	P	27-11650
	H	219	P	S TK RESVR GAS	2	11	41	0	200	PIG		SLO	27 01243	7			P	
	H	224	P	B HYD SYS LO PRESS	2	11	39	[illegible]	200	PIG		SLO	27 01243	11			P	
	H	225	P	B TK RESVR GAS	1	A	3	0	200	PIG		SLO	27 01243	7			P	
	H	315	P	SUS HYD LO PRESS	1	A	21	0	200	PIG		SLO	27 01243	11			P	
	H	227	X	S TK RESVR PISTON	1	A	15	ON	OFF				87 44900	109			P	
	I			INERTIAL GUIDANCE														
	I	513	A	ACCEL XF1 DIRECT	3	C				G							P	
	I	514	A	ACCEL XF2 DIRECT	3	F				G							P	
	I	516	A	ACCELEROMETER YF1	2	A				G							P	
	I	517	A	ACCELEROMETER ZF1	3	13				G							P	
	I	519	A	ACCELEROMETER YF2	2	C				G							P	
	I	520	A	ACCELEROMETER ZF2	3	A				G							P	
	I	549	D	PITCH SERVO ERROR	2	5		M4.1	4.1	MIN		20					P	
	I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20					M	
	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.	DEG		100					P	
	I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
	I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100					M	
	I	552	D	REDNDT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		55					P	

[redacted]

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO. AZC-27-059-13 DATE 22 JUN 60 PAGE 3

VEHICLE SYSTEM	MEAS. NUMBER	TYPE MEAS.	DESCRIPTION	TELEMETRY NO.	SUBCARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
I	552	D	REDNDT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
I	505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	
I	509	H	AZM ERROR FUNCTION	1	E		M300	500	NM		10K					P	
I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
I	572	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
I	531	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	
I	532	T	GYRO 2	1	12	3	M5.3	5.3	DGC		SLO					P	
I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
I	534	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
I	535	T	COMPUTER	1	12	19	0	50	DGC		SLO					P	
I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	
I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10					M	
I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		5					P	
I	529	V	ROLL RESOLVER SIG	2	11	13	M10	10	VAC		5					M	
I	530	V	PITCH RESOLVER SIG	2			M30	30	VAC		10					P	
I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
I	540	V	CONTROL 115 PHASE A	1	12	11	0	130	VDC		SLO					P	
I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
I	543	V	COMPUTER M50 PSUP	3	9		M55	0	VDC		SLO					P	
I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
I	545	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
I	547	V	COMPUTER 6 PSUP	1	13	43	0	8	VDC		SLO					P	
I	548	V	COMPUTER 38 PSUP	1	1	41	0	42	VDC		SLO					P	

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO AZC-27-059-13 DATE 22 JUN 60 PAGE 6

SYSTEM	MEASUREMENT NUMBER	TYPE MEAS.	DESCRIPTION	TELEMETER NO	SUB CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
I	580	V	AZM RESOLVER SIG	2	8		M7.6	7.8	VAC		40					P	
I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
I	510	W	ELAPSED TIME	2	E	D	0	450	SEC		10K					P	
I	581	W	TIME T	2	8	5					BLP					P	
I	521	X	VERN ENGINE COF SIG	2	6	5	OFF	ON			BLP					P	
I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
I	522	X	S ENGINE COF SIG	2	9	5	OFF	ON			BLP					P	
I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					M	
I	523	X	S&V COF RELAYS	2	10	5	OFF	ON			BLP					P	
I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
I	537	X	COMPUTER REDUNDANCY	2	7	5	OFF	ON			BLP					P	
I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
M			MISCELLANEOUS														
M	143	D	BOOSTER SEPARATION	3	7		0	8	IN		16	7 01675	1	1131	1	P	27-11723
M	78	X	STROBE LIGHT OCCUR	1	C	95			VDC		STP					P	
P			PROPULSION SYSTEM														
P	83	R	B2 PUMP SPEED	1	2		5580	6400	RPM		SLO	27 01287	11	1198	2	P	27-11722
P	84	R	B1 PUMP SPEED	2	2		5580	6400	RPM		SLO	27 01287	1	1198	4	M	27-11721
P	149	R	S PUMP SPEED	1	3		9.9	11.2	KPM		SLO	27 01286	3	1234	3	P	27-11720
P	528	D	S MAIN FUEL VALVE	1	4	45	0	90	DEG		SLO	NAA				P	
P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG		SLO	NAA		1205	X	P	27-17564
P	6	P	S THRUST CHAMBER	7	E	1	0	1000	PIA		150	7 21731	8	1235	X	M	27-11770

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CONVAIR-ASTRONAUTICS

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SECTION 8

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MISSILE INSTRUMENTATION LOG SHEET

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA		SLO	7 01720	3	1208	Y	P	27-11651
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA		SLO	7 01737	3	1127	4	P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA		SLO	7 01737	3	1127	2	P	27-11699
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA		SLO	7 01720	3	1208	Y	P	27-11651
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA		15	7 01731	5	1144	3	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	P91		15	7 01731	5	1173	1	P	27-11721
	P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA		SLO	27 01243	9	1235	X	P	27-11720
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA		15	7 01731	1	1244	Y	P	27-11684
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA		15	7 01731	1	1244	Y	P	27-11684
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA		SLO	7 01731	5	1244	Y	P	27-11684
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA		SLO	7 01731	5	1244	Y	P	27-11684
	P	195	P	B1 GAS GEN COMBUSTON	1	12	[illegible]	0	1000	PIA		SLO	7 01731	5			P	27-11722
	P	184	P	B2 GAS GEN COMBUSTON	1	12	33	0	1000	PIA		SLO	7 01731	5			P	27-11720
	P	279	P	B2 LO2 PR LUB OIL MN	2	11	43	0	125	PIA		SLO	27 01243	9			P	
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA		15	7 01731	7	1235	X	P	27-11720
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA		SLO	7 01731	5	1235	X	P	27-11720
	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA		SLO	7 01731	7			P	
	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA		SLO	7 01731	5	1235	X	P	27-11721
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIG		SLO	27 01243	9			P	
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649	1[illegible]	1197	X	P	27-11720
	P	671	T	TH SECT A-B QUAD 4	1	11	39	M100	300	DGF		SL	27 01287	3			P	
	P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 01247	3	1734	4	P	27-11720
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247	3	1710	1	P	27-11721
	P	714	T	B2 GAS GEN COMBUSTO	3	11	7	0	1500	DGF		SLO	27 01247	3	1740	3	P	27-11722
	P	367	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	P	547	X	B1 CUTOFF RELAY	1	7	[illegible]	0	28	VDC		STP					P	
	P	548	X	COMPLETE COF RELAY	1	13	4	0	28	VDC		STP					P	
	S			AUTOPILOT SYSTEM														
	S	81	D	ROLL DISPL GYRO SIG	1	4	9	M3	3	DEG		4					P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO. AZC-27-052-13 DATE 22 JUN 60 PAGE 6

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG		5					P	
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG		5					P	
	S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG		10	7 01680 7		1212	Y	P	
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG		30	7 01680 7		1212	Y	M	27-11721
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG		10	7 01680 7		1212	Y	P	27-11722
	S	205	D	B1 YAW	1	6		M5	5	DEG		10	7 01680 7		1212	4	P	
	S	205	D	B1 YAW	2	11	5	M5	5	DEG		30	7 01680 7		1212	4	M	27-11721
	S	206	D	B2 YAW	2	E	19	M5	5	DEG		10	7 01680 7		1212	2	P	27-11722
	S	222	D	V1 PITCH	2	E	7	0	50	DEG		10	7 01414 1		1123	4	P	27-11699
	S	223	D	V2 PITCH	2	E	5	0	50	DEG		10	7 01414 1		1123	2	P	27-11699
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG		10	27 01205 1		1124	4	P	27-11699
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG		10	27 01205 1		1129	2	P	27-11699
	S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG		6	7 01680 9		1210	Y	P	
	S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG		30	7 01680 9		1210	Y	M	27-11720
	S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG		6	7 01680 3		1210	X	P	
	S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG		30	7 01680 3		1210	X	M	27-11720
	S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S		15					P	
	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S		15					M	
	S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S		15					P	
	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S		15					M	
	S	54	R	YAW RATE GYRO SIG	1	8		M6	6	D/S		15					P	
	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S		15					M	
	S	248	X	RELEASE PAYLOAD	1	13	3	OFF	ON	VDC		STP					P	
	U			PROPELLANT UTILIZ														
	U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID		SLO	27 01280 1		948	3	P	27-11683
	U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01280 1		948	3	P	27-11683
	U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC		SLO					P	
	Y			PAYLOAD														

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SECTION 8

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

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1 VEHICLE	2 SYSTEM	3 MEASUREMENT NUMBER	4 TYPE MEASUREMENT	5 DESCRIPTION	6 TELEMETER NO	7 SUB-CARRIER NO	8 COMMUTATOR PIN NO	9 MEASUREMENT RANGE LOW	9 MEASUREMENT RANGE HIGH	10 UNITS OF FUNCTION	11 ACCURACY	12 RATE OF CHANGE OR FREQUENCY OF FUNCTION	13 TYPE OF TRANSDUCER	14 SERIAL NO	15 STATION NO	16 QUADRANT	17 CARD CODE	DRAWING NUMBERS
	Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
	Z			AZUSA SYSTEM														
	Z	2	E	KLYSTRON PWR OUTPUT	1	11	1					SLO					P	
	Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM		3					P	

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18 U.S.C., SECTIONS 793 AND 794. THE TRANSMISSION [redacted] PROHIBITED BY LAW.

FORM A1326-2

SECTION 9

MISSILE INSTRUMENTATION BY CHANNEL

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by channel.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

UNITS OF FUNCTION

A	P	29	P	V2 THRUST CHAMBER	1	11	5	0	400	PIA		SLO	7 01737 1		1128	2		P	27-11614
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA		SLO	7 01731 3		1243	4		P	27-16500
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA		SLO	7 01723 13		925	Y		P	27-11609
A	P	671	T	TH SECT AMB QUAD 4	1	11	11	100	700	DGF		SLO	7 01634 9		1230	4		P	27-11599

MEASUREMENT NUMBER

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number for the applicable measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO. AZC-27-059-13 DATE 22 JUN 60 PAGE 1

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE-CONT.	1	0	0											
	E	50	O	400 CYCLE AC PWRSUP	1	1		370	430	CPS		SLO					P	
	P	83	B	B2 PUMP SPEED	1	2		5680	6400	RPM		SLO	27 01267 11		1198	2	P	27-11722
	P	349	B	S PUMP SPEED	1	3		9.9	11.2	KPM		SLO	27 01264 3		1234	3	P	27-11720
	S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG		6	7 01680 9		1210	Y	P	27-11720
	S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG		6	7 01680 3		1210	X	P	27-11720
	S	205	D	B1 YAW	1	6		M5	5	DEG		10	7 01680 7		1212	4	P	27-11721
	D	1	V	RSC CUTOFF OUTPUT	1	6	S	0	31	VDC		BLP					M	
	S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG		10	7 01880 7		1212	Y	P	27-11721
	P	547	X	B1 CUTOFF RELAY	1	7	S	0	28	VDC		STP					P	
	S	54	R	YAW RATE GYRO SIG	1	8		M6	6	D/S		15					P	
	S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S		15					P	
	S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S		15					P	

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SECTION 9

22 JUNE 1960

CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO. AZC-27-059-13 DATE 22 JUN 60 PAGE 2

Vehicle (1)	System (2)	Measurement Number (3)	Type Measurement (4)	Description (5)	Telemeter No (6)	Sub-Carrier No (7)	Commutator Pin No (8)	Measurement Range Low (9)	Measurement Range High (9)	Units of Function (10)	Accuracy (11)	Rate of Change or Frequency of Function (12)	Type of Transducer (13)	Serial No. (14)	Station No. (15)	Quadrant (16)	Card Code (17)	Drawing Numbers
				COMM. RATE 2.5 RPS	1	11	0											
	Z	2	E	KLYSTRON PWR OUTPUT	1	11	1					SLO					P	
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E		SLO					P	
	F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01684 3		1205	4	P	27-11682
	G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA		SLO					P	
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11		1197	X	P	27-11720
					1	11	11											
	A	638	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3				P	27-11793
					1	11	15											
	G	503	V	MOD III PB AGC	1	11	17	0	M4.8	VDC		SLO					P	
					1	11	19											
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
					1	11	23											
				100% CALIB	1	11	25											
				0% CALIB	1	11	27											
				0% CALIB	1	11	29											
	Z	2	E	CONNECTED TO 1 11 1	1	11	31											
	G	582	V	CONNECTED TO 1 11 3	1	11	33											
	F	247	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01633 5		1221	4	P	27-11682
	G	504	C	CONNECTED TO 1 11 7	1	11	37											
	P	671	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	27 01287 3				P	
					1	11	41											
					1	11	43											
					1	11	45											
	G	503	V	CONNECTED TO 1 11 17	1	11	47											
					1	11	49											
	G	579	V	CONNECTED TO 1 11 21	1	11	51											
					1	11	53											
				SYNC & 100% CALIB	1	11	55											
				CONNECTED TO 1 11 55	1	11	56											
				CONNECTED TO 1 11 56	1	11	57											
				CONNECTED TO 1 11 57	1	11	58											
				CONNECTED TO 1 11 58	1	11	59											

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO AZC-27-059-13 DATE 22 JUN 60 PAGE 3

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE 5 RPS	1	12	0											
	I	531	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	
	I	532	T	GYRO 2	1	12	3	M6.3	6.3	DGC		SLO					P	
	I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
					1	12	7											
					1	12	9											
	I	540	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		SLO					P	
	I	534	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
	I	572	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
	F	145	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA		SLO	7 01720 5		1213	2	P	27-11650
	I	535	T	COMPUTER	1	12	19	0	50	DGC		SLO					P	
	I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
	P	155	P	B1 GAS GEN COMBUSTON	1	12	23	0	1000	PIA		SLO	7 01731 5				P	27-11722
				100% CALIB	1	12	25											
				0% CALIB	1	12	27											
				50% CALIB	1	12	29											
					1	12	31											
	P	184	P	B2 GAS GEN COMBUSTON	1	12	33	0	1000	PIA		SLO	7 01731 5				P	27-11720
	I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
	P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG		SLO	NAA		1205	X	P	27-17564
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
	I	548	V	COMPUTER 35 PSUP	1	12	41	0	42	VDC		SLO					P	
	H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA		SLO	7 01731 9		1173	1	P	27-11721
	I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
	I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	522	X	S ENGINE COF SIG	1	12	40	OFF	ON			STP					P	
	I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA		SLO	7 01720 5		1213	2	P	27-11650
	F	246	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA		SLO	7 01720 5		1187	4	P	27-11682
				SYNC & 100% CALIB	1	12	55											
				CONNECTED TO 1 12 55	1	12	56											
				CONNECTED TO 1 12 56	1	12	57											
				CONNECTED TO 1 12 57	1	12	58											
				CONNECTED TO 1 12 58	1	12	59											

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MISSILE 13E REPORT NO AZC-27-059-13 DATE 22 JUN 60 PAGE 4

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 5 RPS	1	13	0											
					1	13	1											
	S	248	X	RELEASE PAYLOAD	1	13	3	OFF	ON	VDC		STP					P	
	P	548	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP					P	
	D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC		STP					P	
	P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	E	28	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC		SLO					P	
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA		SLO	7 01720 3		1208	Y	P	27-11651
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA		SLO	7 01731 5		1244	Y	P	27-11684
	P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA		SLO	27 01243 9		1235	X	P	27-11720
					1	13	19											
	U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01280 1		948	3	P	27-11683
	E	53	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC		SLO					P	
				100% CALIB	1	13	25											
				0% CALIB	1	13	27											
				50% CALIB	1	13	29											
	U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID		SLO	27 01280 1		948	3	P	27-11683
	F	1	P	LO2 TANK HELIUM	1	13	33	0	45	PIA		SLO	7 01723 11		484	3	P	27-11679
					1	13	35											
	F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA		SLO	7 01723 13		948	3	P	27-116[illegible]
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA		SLO	7 01731 5		1244	Y	P	27-11684
	I	545	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
	I	547	V	COMPUTER 6 PSUP	1	13	43	0	6	VDC		SLO					P	
					1	13	45											
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA		SLO	7 01720 3		1208	Y	P	27-11651
	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA		SLO	7 01731 5		1235	X	P	27-11721
					1	13	51											
	E	53	V	CONNECTED TO 1 13 23	1	13	53											
				SYNC & 100% CALIB	1	13	55											
				CONNECTED TO 1 13 55	1	13	56											
				CONNECTED TO 1 13 56	1	13	57											
				CONNECTED TO 1 13 57	1	13	58											
				CONNECTED TO 1 13 58	1	13	59											

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO AZC-27-059-13 DATE 22 JUN 60 PAGE 5

VEHICLE SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
			COMM. RATE 10 RPS	1	A	0											
E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC		SLO					P	
H	225	P	B TK RESVR GAS	1	A	3	0	200	PIG		SLO	27 01243 7				P	
D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	100K	UV		SLO					P	
U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC		SLO					P	
S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG		5					P	
S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG		5					P	
S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG		5					P	
H	227	X	S TK RESVR PISTON	1	A	15	ON	OFF				87 44900 109				P	
Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM		3					P	
Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
H	315	P	SUS HYD LO PRESS	1	A	21	0	200	PIG		SLO	27 01243 11				P	
				1	A	23											
			100% CALIB	1	A	25											
			0% CALIB	1	A	27											
			50% CALIB	1	A	29											
P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA		SLO	7 01731 5		1235	X	P	27-11720
P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA		SLO	7 01737 3		1127	4	P	27-11699
P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA		SLO	7 01737 3		1127	2	P	27-11699
U	91	V	CONNECTED TO 1 A 7	1	A	37											
S	61	D	CONNECTED TO 1 A 9	1	A	39											
S	62	D	CONNECTED TO 1 A 11	1	A	41											
S	63	D	CONNECTED TO 1 A 13	1	A	43											
P	528	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG		SLO	NAA				P	
Z	3	E	CONNECTED TO 1 A 17	1	A	47											
				1	A	49											
				1	A	51											
				1	A	53											
			SYNC & 100% CALIB	1	A	55											
			CONNECTED TO 1 A 55	1	A	56											
			CONNECTED TO 1 A 56	1	A	57											
			CONNECTED TO 1 A 57	1	A	58											
			CONNECTED TO 1 A 58	1	A	59											

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code
				COMM. RATE 1/8 RPS	1	C	0										
	N	78	X	STROBE LIGHT OCCUR	1	C	95			VDC		STP					P

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO AZC-27-059-13 DATE 22 JUN 60 PAGE 7

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				DIGITAL CHANNEL	1	E	0											
	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	5K	F/S		10K					P	
	I	510	W	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
	I	505	H	COMPUTER POSITION X	1	E	E	[illegible]	6K	NM		10K					P	
	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
	I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO AZC-27-059-13 DATE 22 JUN 60 PAGE 6

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBER
				COMM. RATE CONT.	2	0	0											
					2	1												
	P	84	B	B1 PUMP SPEED	2	2		5680	6460	RPM		SLO	27 01267	1	1198	4	P	27-11731
	I	329	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
	I	330	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
	I	328	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	
	I	549	D	PITCH SERVO ERROR	2	6		M4.6	4.1	MIN		20					P	
	I	321	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP					P	
	I	552	D	REDNDT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35					P	
	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
	I	583	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	
	I	581	W	TIME T	2	8	S					BLP					P	
	I	55	D	ROLL SERVO ERROR	2	9		M4.1	4.1	DEG		100					P	
	I	522	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP					P	
	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
	I	523	X	S&V COF RELAYS	2	10	S	OFF	ON			BLP					P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO. AZC-27-059-13 DATE 22 JUN 60 PAGE 9

VEHICLE SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUBCARRIER NO	COMMUTATOR PT NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
			COMM. RATE 2.5 RPS	2	11	0											
S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG		[illegible]	7 01680	9	1210	Y	M	
S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG		[illegible]	7 01680	3	1210	X	M	
S	205	D	B1 YAW	2	11	5	M5	5	DEG		30	7 01680	7	1212	[illegible]	M	
S	20[illegible]	D	B1 PITCH ROLL	2	11	7	M5	5	DEG		30	7 01680	7	1212	Y	M	
S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S		15					M	
S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S		15					M	
S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S		15					M	
I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6					M	
I	53[illegible]	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10					M	
I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20					M	
I	552	D	ROLLOUT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
			10 % CALIB	2	11	25											
			0% CALIB	2	11	27											
			[illegible] CALIB	2	11	29											
I	[illegible]	V	AZM RESOLVER SIG	2	11	31	M7.[illegible]	7.[illegible]	VAC		40					M	
I	55[illegible]	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
I	551	D	AZIMUTH SERVO ERROR	2	11	35	M4.1	4.1	MIN		100					M	
				2	11	37											
H	224	P	[illegible] HYD [illegible] LO PRESS	2	11	39	0	[illegible]	PSID		[illegible]	27 [illegible]	11			P	
H	219	P	[illegible] TK PRESS [illegible]	2	11	41	0	[illegible]	PSI[illegible]		[illegible]	27 [illegible]	[illegible]			P	
P	279	P	B2 LO2 PR LUB OIL MAN	2	11	43	0	150	PSIA		[illegible]	[illegible]	[illegible]			P	
P	47[illegible]	P	B1 LO PR LUB OIL MAN	2	11	45	0	150	PSI[illegible]		[illegible]	27 [illegible]	[illegible]			P	
P	54[illegible]	P	[illegible] LUBE OIL MANIFOLD	2	11	47	[illegible]	[illegible]	PSIA		[illegible]	[illegible]	[illegible]			P	
				2	11	49											
				2	11	51											
				2	11	53											
			TEMP & [illegible] CALIB	2	11	55											
			CONNECTED TO 2 11 55	2	11	56											
			CONNECTED TO 2 11 56	2	11	57											
			CONNECTED TO 2 11 57	2	11	58											
			CONNECTED TO 2 11 58	2	11	59											

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Vehicle	Sys	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE CONT.	2	12	0											
					2	12												
					[illegible]	13												
	I	516	A	ACCELEROMETER YF1	2	A				G							7	
	I	519	A	ACCELEROMETER YF2	2	C				G							9	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO. AZC-27-059-13 DATE 22 JUN 60 PAGE 11

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 30 RPS	2	E	0											
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA		150	7 01731 5		1235	X	P	27-11720
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA		15	7 01731 7		1235	X	P	27-11720
	S	223	D	V2 PITCH	2	E	5	0	50	DEG		10	7 01414 1		1123	2	P	27-11699
	S	222	D	V1 PITCH	2	E	7	0	50	DEG		10	7 01414 1		1123	4	P	27-11699
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA		15	7 01731 1		1244	Y	P	27-11684
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA		15	7 01731 1		1264	Y	P	27-11684
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG		10	27 01205 1		1124	4	P	27-11699
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG		10	7 01630 7		1212	Y	P	27-11722
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG		10	27 01205 1		1129	2	P	27-11699
	S	206	D	B2 YAW	2	E	19	M5	5	DEG		10	7 01680 7		1212	2	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	P91		15	7 01731 5		1173	1	P	27-11721
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA		15	7 01731 5		1144	3	P	27-11722
				100% CALIB	2	E	25											
				0% CALIB	2	E	27											
				50% CALIB	2	E	29											
	P	6	P	CONNECTED TO 2 E 1	2	E	31											
	P	330	P	CONNECTED TO 2 E 3	2	E	33											
	S	223	D	CONNECTED TO 2 E 5	2	E	35											
	S	222	D	CONNECTED TO 2 E 7	2	E	37											
	P	60	P	CONNECTED TO 2 E 9	2	E	39											
	P	59	P	CONNECTED TO 2 E 11	2	E	41											
	S	233	D	CONNECTED TO 2 E 13	2	E	43											
	S	204	D	CONNECTED TO 2 E 15	2	E	45											
	S	234	D	CONNECTED TO 2 E 17	2	E	47											
	S	206	D	CONNECTED TO 2 E 19	2	E	49											
	P	39	P	CONNECTED TO 2 E 21	2	E	51											
	P	38	P	CONNECTED TO 2 E 23	2	E	53											
				SYNC & 100% CALIB	2	E	55											
				CONNECTED TO 2 E 55	2	E	56											
				CONNECTED TO 2 E 56	2	E	57											
				CONNECTED TO 2 E 57	2	E	58											
				CONNECTED TO 2 E 58	2	E	59											
	D	3	X	RSC DESTRUCT OUTPUT	2	E	95	0	30	VDC		STP					P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO. AZC-27-059-13 DATE 22 JUN 60 PAGE 12

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE CONT.	3	0	0											
	M	143	D	BOOSTER SEPARATION	3	7		0	8	IN		14	7 01676 1		1131	1	P	27-11723
	I	543	V	COMPUTER M50 PSUP	3	9		M55	0	VDC		SLO					P	

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO AZC-27-059-13 DATE 22 JUN 60 PAGE 13

VEHICLE (1)	SYSTEM (2)	MEASUREMENT NUMBER (3)	TYPE MEASUREMENT (4)	DESCRIPTION (5)	TELEMETER NO (6)	SUB-CARRIER NO (7)	COMMUTATOR PIN NO (8)	MEASUREMENT RANGE LOW (9)	MEASUREMENT RANGE HIGH (9)	UNITS OF FUNCTION (10)	ACCURACY (11)	RATE OF CHANGE OR FREQUENCY OF FUNCTION (12)	TYPE OF TRANSDUCER (13)	SERIAL NO (14)	STATION NO. (15)	QUADRANT (16)	CARD CODE (17)	DRAWING NUMBERS
				COMM. RATE 2.5 RPS	3	11	0											
					3	11	1											
					3	11	3											
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247 3		1210	1	P	27-11721
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247 3		1210	3	P	27-11722
	P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 01247 3		1234	4	P	27-11720
					3	11	11											
					3	11	13											
					3	11	15											
					3	11	17											
					3	11	19											
					3	11	21											
					3	11	23											
				100% CALIB	3	11	25											
				0% CALIB	3	11	27											
				0% CALIB	3	11	29											
					3	11	31											
					3	11	33											
					3	11	35											
					3	11	37											
					3	11	39											
					3	11	41											
					3	11	43											
					3	11	45											
					3	11	47											
					3	11	49											
					3	11	51											
					3	11	53											
				SYC & 100% CALIB	3	11	55											
				CONNECTED TO 3 11 55	3	11	56											
				CONNECTED TO 3 11 56	3	11	57											
				CONNECTED TO 3 11 57	3	11	58											
				CONNECTED TO 3 11 58	3	11	59											

[redacted]

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[redacted]

CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E REPORT NO. AZC-27-059-13 DATE 22 JUN 60 PAGE 14

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE CONT.	3	13	0											
	I	517	A	ACCELEROMETER ZF1	3	13				G							)	
	I	520	A	ACCELEROMETER ZF2	3	A				G							P	
	I	513	A	ACCEL XF1 DIRECT	3	C				G							P	
	I	514	A	ACCEL XF2 DIRECT	3	E				G							P	

[redacted]

SECTION 10

LANDLINE INSTRUMENTATION

The Landline Instrumentation presented in this section contains the latest available characteristics of the . dividual measurements. In addition the type of recordings indicated.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

UNITS OF FUNCTION

FREQUENCY RESPONSE

Denotes the frequency response requirements in cps of the instrumentation system for the measurement.

TRANSDUCER SERIAL NUMBER

[redacted]

A	F	1125	P	B CTL PNEU REG OUT	S	200	800	PIA	16	SLO	7 01731	3	2841	1243 4	27-16500
A	F	1194	P	FACILITY GN_2 SUPPLY	S	0	2400	PIG	48	SLO					
A	F	1283	P	ST PNEU REG OUT	S	0	800	PIA	10	SLO	7 01720	1		1223 2	27-16505
A	G	1026	V	PITCH ANALOG	D	M30	30	VDC	0.2	SLO					27-0001-3

MEASUREMENT NUMBER

ACCURACY REQUIREMENT

Present in units of the function measured.

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

RECORDER ASSIGNMENT

This code defines the method to be utilized to record the measurement. A double letter here indicates that this measurement will be recorded on two different types of recorders.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

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SECTION 10

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E LANDLINE   REPORT NO AZC-27-059-13   DATE 22 JUN 60   PAGE 1

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	D			RANGE SAFETY SYSTEM														
	D	M142	V	RSC #1 BAT DC		M											P	
	D	M143	V	RSC #2 BAT DC		M											P	
	D	M140	W	RSC #1 TOTAL TIMER		M		0	1000	HR							P	
	D	M141	W	RSC #2 TOTAL TIMER		M		0	1000	HR							P	
	D	M150	W	RSC #1 & 2 BATTERY		M		0	1000	HR							P	
	E			ELECTRICAL POWER SYS														
	E	M066	C	MISSILE DC AMPS		M		0	200	AMP							P	
	E	M068	C	EMERGENCY GENERATOR		M		0	200	AMP							P	
	E	M005	Q	MISSILE INT PHASE A		M		396	404	CPS							P	
	E	M029	Q	MISSILE EXT PHASE A		M		396	404	CPS							P	
	E	M031	Q	PHASE A EXT @ MSL		M		396	404	CPS							P	
	E	M003	V	MISSILE INTERNAL DC		M		0	40	VDC							P	
	E	M006	V	MISSILE INTERNAL AC		M		110	120	VAC							P	
	E	M022	V	MISSILE AC EXT @ MSL		M		110	120	VAC							P	
	E	M023	V	MISSILE EXTERNAL AC		M		110	120	VAC							P	
	E	M030	V	MISSILE DC EXT @ MSL		M		0	40	VDC							P	
	E	M065	V	MISSILE EXTERNAL DC		M		0	40	VDC							P	
	E	M109	W	MAIN MSL BATT TIMER		M											P	
	E	M110	W	INVERTER TIMER		M											P	
	F			PNEUMATIC SYSTEM														
	F	1001	P	LO2 TANK HELIUM		M		0	50	PIG	1	SLO	27 01243 5		484	3	P	27-11679
	F	M001	P	LO2 TANK HELIUM		M		0	30	PIG			27 01243 5		484	3	P	27-11679
	F	1003	P	FUEL TANK HELIUM		O		0	75	PIG	1	SLO	27 01243 7		948	3	P	

[redacted]

REPORT NO. AZC-27-059-13 [redacted]

SECTION 10

22 JUNE 1960

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E LANDLINE REPORT NO AZC-27-059-13 DATE 22 JUN 60 PAGE 2

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	[illegible] Number
																		27-11683
F		M003	P	FUEL TANK HELIUM		M		0	75	PI[illegible]			27 01243	7	948	3	P	27-11683
F		M032	P	LN2 PRESSURE		M		0	4000	PIG							P	
F		M[illegible]3	P	NORM SUP PRESSURE		M		0	4000	PIG							P	
F		M054	P	EMERG SUP PRESSURE		M		0	4000	PIG							P	
F		M116	P	DIFFERENTIAL PRESS		M		0	5	PID							P	
F		1145	P	S CTL HE BTL DISCH		S		0	3500	PIA	105	SLO	7 01720	5	1213	2	P	27-11650
F		M145	P	S CTL HE BTL DISCH		M		0	3500	PIA	105	SLO	7 01720	5	1213	2	P	27-11650
F		1246	P	B TANK HE BOTTLES HI		S		0	3500	PIG	65	SLO	7 01720	5	1200	4	P	27-11682
F		M246	P	B TANK HE BOTTLES HI		M		0	4000	PIG			7 01720	5	1200	4	P	27-11682
F		M248	P	S TANK HE BOTTLE HI		M		0	3250	PIA	65	20					P	
F		M247	T	BSTR TANK TEMP		M		M90	M380	DGF			7 01633	5	1221	4	P	27-11682
I				INERTIAL GUIDANCE														
I		1515	A	ACCELEROMETER X F1													P	
I		15[illegible]	A	ACCELEROMETER Y F1													P	
I		1517	A	ACCELEROMETER Z F1													P	
I		1518	A	ACCELEROMETER X F2													P	
I		1519	A	ACCELEROMETER Y F2													P	
I		1520	A	ACCELEROMETER Z F2													P	
I		1591	C	PITCH GYRO TORQUE				M75	75	MA							P	
I		1592	C	ROLL GYRO TORQUE				M75	75	MA							P	
I		1593	C	YAW GYRO TORQUE				M75	75	MA							P	
I		1594	D	PENDULUM #1 NULL		D	4	M20	20	MIN							P	
I		1595	D	PENDULUM #2 NULL		D	5	M[illegible]	20	MIN							P	
I		1596	D	OPTIC SIGNAL		D	6	M7.5	7.5	MIN							P	
I		1505	H	COMPUTER POSITION X				0	6K	NM		105					P	
I		1506	H	COMPUTER POSITION Y				M300	500	NM		10K					P	

[redacted]

MISSILE INSTRUMENTATION LOG SHEET

13E LANDLINE AZC-27-059-13 DATE 22 JUN 60 PAGE 3

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Range Low	Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station	Quadrant	Card Code	Draw No. Number
	I	1507	H	COMPUTER POSITION Z				0	700	NM		10K					P	
	I	1508	H	RANGE ERROR FUNCTION				0	6K	NM		10K					P	
	I	1509	H	AZM ERROR FUNCTION				M300	0500	NM		10K					P	
	I	1502	L	COMPUTER VELOCITY X				0	22K	F/S		10K					P	
	I	1503	L	COMPUTER VELOCITY Y				0	4K	F/S		10K					P	
	I	1504	L	COMPUTER VELOCITY Z				0	6K	F/S		10K					P	
	I	1601	V	400 CPS REFERENCE													P	
	I	1510	W	ELAPSED TIME													P	
	I	1521	X	VERN ENGINE COF SIG				ON	OFF								P	
	I	1522	X	S ENGINE COF SIG				ON	OFF								P	
	I	1570	X	STAGING SIG													P	
	I	1603	X	WORD GATE FIVE				ON	OFF								P	
	I	1604	X	MULT GATE SIX				ON	OFF								P	
	I	1605	X	112 CPS GATE				ON	OFF								P	
	M			MISCELLANEOUS														
	M	M144	V	STROBELIGHT BATTERY	M												P	
	M	1090	Y	MSL ONE INCH MOTION	R			OFF	ON								P	
	N			[illegible]														
	N	M3A[illegible]	P	36 INCH WATER VALVE	M												P	
	N	131[illegible]	P	SLUG CH LO2 DISCH	S			0	5[illegible]	PIG		SLO					P	
	N	1314	T	SLUG CH LO2 DISCH	S			M2[illegible]	M325	DGF		SLO					P	
	N	1335	X	SLG CH LO2 DISCH VLV	P			OPEN	CLOS			SLO					P	
	N	1336	X	SLG CH LO2 VENT VLV	P			OPEN	CLO[illegible]			SLO					P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E LANDLINE REPORT NO. AZC-27-059-13 DATE 22 JUN 60 PAGE 4

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	TRACE NUMBER
	N	1337	X	SLG CH LO2 INLET VLV	R			OPEN	CLOS			SLO					P	
	N	1338	X	SLG CH LN2 INLET VLV	R			OPEN	CLOS			SLO					P	
	N	1339	X	SLG CH GN2 INLET VLV	R			OPEN	CLOS			SLO					P	
	P			PROPULSION SYSTEM														
	P	N242	R	PUMP LC SPEED	M			0	100	PCT							P	
	P	1528	D	S MAIN FUEL VALVE	S			0	87.5	DEG	2	SLO					P	
	P	M685	M	FUEL IN MISSILE	M			0	100	GAL							P	
	P	1010	P	B1 LUBE OIL INJ MAN	S			0	1000	PIA	50	SLO	7 01731	7	1173	1	P	27-11721
	P	1011	P	B2 LUBE OIL INJ MAN	S			0	1000	PIA	50	SLO	7 01731	7	1144	3	P	27-[illegible]
	P	1232	P	S LO2 SEAL CAVITY	S			0	15	PIG	2	SLO	27 01243	5	1235	X	P	27-11720
	P	M373	P	LO2 STORAGE TANK	M			0	50	PIG							P	
	P	1465	P	S LO PR LUBE OIL MAN	S			0	100	PIG		SLO	27 01243	9	1235	X	P	27-11720
	P	1474	P	V CTL PRESS REG OUT	S			200	800	PIA	16	SLO	7 [illegible]	3	1205	[illegible]	P	[illegible]
	P	1325	T	ENG COMP AMBIENT	S			M100	500	DGF	3	SLO	7 01884	5	1204	V	P	27-11651
	P	1709	T	SGG COMBUSTOR	S			0	1500	DGF		6					P	
	P	1710	T	SE ENVIRONMENT	S			M100	500	DGF		SLO	7 01884	5	1235	3	P	27-17560
	P	1711	T	B1 NACELLE AMBIENT	S			M100	500	DGF		SLO	7 01884	5	1204	4	P	27-17560
	P	1712	T	B2 NACELLE AMBIENT	S			M100	500	DGF		SLO	7 01884	5	1204	2	P	27-17546
	P	1713	T	B1 GAS GEN COMBUSTOR	S			0	1500	DGF		6					P	
	P	1714	T	B2 GAS GEN COMBUSTOR	S			0	1500	DGF		6					P	
	P	M849	M	LO2 SLNG XFER & FIRE	M												P	
	P	1155	X	OBSERVER CUTOFF	R			OFF	ON	VDC		STP					P	
	P	1181	X	TCC START SWITCH	R			OFF	ON	VDC		STP					P	
	P	1184	X	TCC ENGINE OFF SW	R			OFF	ON	VDC		STP					P	
	P	1347	X	S CUTOFF RELAY	R			OFF	ON	VDC		STP					P	

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Meas. No.	Description	Recorder	Range Low	Range High	Units		Rate	
[illegible] 1544	[illegible] CONTROL	D	OFF	ON	VDC		STP	D
D 1545 X	[illegible] STAGE CONTROL	D	OFF	ON	VDC		STP	D
D 1546 X	[illegible] CUTOFF RELAY	D	OFF	ON	VDC		STP	D
[illegible] 1547 X	[illegible] CUTOFF [illegible] LAY	D	OFF	ON	VDC		STP	D
D 1548 X	[illegible] RELAY	D	OFF	ON	VDC		STP	D
D 1549 X	IGNITION START	D	OFF	ON	VDC		STP	D
	AUTOPILOT SYSTEM							
[illegible]	ROLL [illegible] GRAM READOUT	M						D
[illegible]	PROGRAMMER PITCH [illegible]	D	0	2.7	VAC	.2	SUD	D
[illegible]	PROGRAMMER ROLL SIG	D	[illegible]	[illegible]	VAC	3	STP	D
[illegible]	PITCH [illegible] FEEDBACK	D	M12	12	VAC	5%	40	D
[illegible]	[illegible] FEEDBACK	D	M12	12	AC	5%	30	D
[illegible]	[illegible] YAW [illegible] FEEDBACK	D	M6	7	VAC	5%	30	D
[illegible]	[illegible]	D	M6	7	VAC	5%	30	D
[illegible]	[illegible]	D	M11	11	VAC	5%	30	D
[illegible]	[illegible]	[illegible]	[illegible]	11	VAC	5%	30	D
[illegible]	[illegible]	D	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	D
[illegible]	[illegible]	[illegible]	M11	11	VAC	5%	30	D
[illegible]	[illegible]	[illegible]	M12	12	VAC	5%	30	D
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5%	30	D
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	VAC	[illegible]	30	D
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	D
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	VAC	[illegible]	[illegible]	D
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	VAC	5%	[illegible]	D
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	VAC	5%	[illegible]	D
[illegible]	[illegible]	M	[illegible]	[illegible]	[illegible]			D
[illegible]	[illegible]	M	[illegible]	[illegible]	VAC			D
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	VAC			D
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			D

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CONVAIR ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E LANDLINE REPORT NO AZC-27-059-13 DATE 22 JUN 60 PAGE 8

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Number
	S	M262	W	DECADE EVENT TIMER		M		0	K100	SEC							P	
	S	1235	X	PROGRAMMER RUN TIME		R		OFF	ON	VDC		STP					P	
	T			TELEMETERING SYSTEM														
	T	M140	V	TLM #1 BAT DC		M											P	
	T	M141	V	TLM #1 EXTERNAL DC		M											P	
	T	M144	V	TLM #2 BAT DC		M											P	
	T	M145	V	TLM #2 EXTERNAL DC		M											P	
	T	M146	V	TLM #3 BAT DC		M											P	
	T	M147	V	TLM #3 EXTERNAL DC		M											P	
	T	M156	V	TLM 1 FIL INT DC		M											P	
	T	M157	V	TLM 1 FIL EXT DC		M											P	
	T	M158	V	TLM 2 FIL INT DC		M											P	
	T	M159	V	TLM 2 FIL EXT DC		M											P	
	T	M160	V	TLM 3 FIL INT DC		M											P	
	T	M161	V	TLM 3 FIL EXT DC		M											P	
	T	M150	W	TLM #1 TOTAL		M		0	1000	HR							P	
	T	M151	W	TLM #2 TOTAL		M		0	1000	HR							P	
	T	M152	W	TLM #3 TOTAL		M		0	1000	HR							P	
	T	M153	W	TLM #1 BAT TIMER		M											P	
	T	M154	W	TLM #2 BAT TIMER		M											P	
	T	M155	W	TLM #1 BATTERY		M		0	60	MIN							P	
	U			PROPELLANT UTILIZ														
	U	1091	V	ERROR RATIO DEMOD OP		S		M20	20	VDC	.5	20					P	
	U	1200	X	LO2 100% SLUG CUTOFF		R		OFF	ON	VDC		STP					P	
	U	1201	X	LO2 TOPG HI CTL		R		OFF	ON	VDC		STP					P	
	U	1202	X	LO2 TOPG LO CTL		R		OFF	ON	VDC		STP					P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 13E LANDLINE REPORT NO. AZC-27-059-13 DATE 22 JUN 60 PAGE 7

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	U	1203	X	LO2 95% RAPID LOAD		R		OFF	ON	VDC		STP					P	
	U	1204	X	FUEL 100% SEC CTL		R		OFF	ON	VDC		STP					P	
	U	1205	X	FUEL 100% PRI CTL		R		OFF	ON	VDC		STP					P	
	U	1206	X	FUEL 95% SEC CTL		R		OFF	ON	VDC		STP					P	
	U	1207	X	FUEL 95% PRI CTL		R		OFF	ON	VDC		STP					P	
	U	1208	X	LO2 100% SLUG COF-2		R		OFF	ON	VDC		STP					P	
	U	1209	X	LO2 TOPG HI CTL-2		R		OFF	ON	VDC		STP					P	
	U	1210	X	LO2 TOPG LO CTL-2		R		OFF	ON	VDC		STP					P	
	U	1211	X	LO2 95% RAPID LOAD-2		R		OFF	ON	VDC		STP					P	

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DATE 18 August 1960
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CONVAIR (ASTRONAUTICS) DIVISION
GENERAL DYNAMICS CORPORATION

WS-107A-1

INSTRUMENTATION CONFIGURATION

SERIES E ARTICLE 16

AMR

PREPARED BY TEST PLANNING

CO-ORDINATED BY W S Becker
W. S. Becker

APPROVED BY H R Macdonald
Bm
H. R. Macdonald
Test Planning

CHECKED BY M. L. Male
for T. M. Wooster
Instrumentation

APPROVED BY P. J. Lynch
P. J. Lynch
Chief— Field Test Engineering

REPORT AZC-27-059-16

PAGE NO. A

CONVAIR ASTRONAUTICS

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
A	8 Mar.'61	WSB	ADDITIONS:	ALL TABS
			A933T, A934T, A935T, F17T, F97T,	
			F146T, F371T, F374T, F375T, F376T,	
			F377T, F773T, F774T, F775T, F776T,	
			F777T, F780T, F781T, F782T, F1301P,	
			F1302P, 11606V, N1356X, N1932X,	
			N1979X, P14390, P14520, P14530, P1020T,	
			P1054T, Y103X.	
			REASONS FOR REVISION "A" CHANGES	4-1
A	8 Mar.'61	WSB	DELETIONS:	ALL TABS
			N1314T, P1010P, P1011P, P1232P,	
			P1465P, P147[illegible], P1226X, P1227X,	
			P1228X, P1785X, S1049X, Z2E.	
			[illegible signature]	

FORM NO. A-[illegible]-1

FOREWORD

This report has been published in accordance with contractual requirements as cited in Convair-Astronautics Report ZM-7-289. It describes the instrumentation released for Missile 16E as of 8 March 1961. 1 A

Information presented here will be used by Air Force, Associate Contractors, Design, Operation, and Field Test Groups. Measurement modification will either originate in the Instrumentation section of the Test Planning Group or will be submitted as a recommendation to this group.

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SUMMARY

The instrumentation configuration for this missile has been established through a study of program test objectives, systems analysis, and operating considerations. A discussion of missile instrumentation and associated characteristics has been summarized in Report AZC-27-059. For a detailed description of the various missile systems, test objectives, and general test program, see Report AE60-0437.

The specific measurements to be transmitted via telemeter have been tabulated and are listed in Sections 8 and 9 in terms of instrumentation system and telemeter channel assignments.

In addition to the telemetry, the landline instrumentation programs for this missile has been included in this report in the form of a master tabulation of landline measurement characteristics, (Section 10).

To clarify specific measurements, instrumentation location schematics have been insluded in Report AZC-27-059, Section 7.

There are a total of 191 telemetered measurements on 46 channels in this missile divided as follows:

	ACCEL	DEFL	POS	PRES	TEMP	VOLT	DIS. POS	MISC	TOTAL
A/FRAME					34				34
PNEU				8	18				26
GUID						2		2	4
HYD				2					2
INER. GUID	6	4	5	1	5	11	8	5	45
PROP		2		20	5		3	3	33
A/P SYS		13					1	3	17
MISC	1	1		2	2	7	14	3	30
TOTAL	7	20	5	33	64	20	26	16	191

There are also 168 measurements recorded and displayed via 168 landline channels.

REASONS FOR REVISION "A" CHANGES

I Data obtained from the following temperature measurements will reveal total heating rates, relative heating intensity of a hot spot between the engines, the relative heating intensities of the outer and inner heat shield peripheries, and model scaling laws applicable to recirculation predictions.

MEAS. NO. ADD	DESCRIPTION	CHANNEL
A933T	AEDC AFT SHIELD CALOR	3-10-41
A934T	AEDC AFT SHIELD CALOR	3-10-43
A935T	AEDC AFT SHIELD CALOR	3-10-45

II To provide higher quality data during the critical portions of launch, and supply booster engine rough combustion data for the first 15 feet of missile travel, three (3) accelerometer measurements will be monitored via trailing wire umbilical.

MEAS. NO ADD	DESCRIPTION
P14390	S NAA RCC ACCEL
P14520	B1 NAA RCC ACCEL
P14530	B2 NAA RCC ACCEL

III Computer Reset I1606 V, demonstrates the start of computer cycling; it is a convenient initial operating time reference to be used with measurement I1510 W, ELAPSED TIME.

IV The booster engine LOX pump inlet temperatures (P1020T, P1054T) will be monitored by regular landline instrumentation system during launch countdown. This information will assure that turbopump starting NPSH requirements are satisfied and determine the adequacy of the LOX topping and slug systems.

V It is important to know the weight of LOX boiloff during flight for accurate evaluation of the overall effect on missile performance resulting from the removal of intermediate bulkhead insulation. Sixteen (16) temperature measurements have been added to provide this data.

VI Four measurements have been added to determine that proper sequencing of the LOX slug transfer valves occurs.

MEAS. ADD	DESCRIPTION
N1356X	SLG CHG LO_2 LOW LEVEL
N1932X	LO_2 TPNG VLV CLOSED
N1933X	LO_2 TPNG VLV CLOSED
N1979X	PRESS VLV CLOSED

VII These measurements, applicable only of FRF missiles, have been deleted on 16E.

MEAS. DELETE	DESCRIPTION
P1010P	B1 LUBE OIL INJ MAN
P1011P	B2 LUBE OIL INJ MAN
P1232P	S LO_2 SEAL CAVITY
P1465P	S LO PR LUBE OIL MAN
P1227X	LOX DOME PURGE
P1228X	IGNITER FUEL PURGE
P1785X	B SECONDARY SHUTDOWN
P1226X	PNEUMATICS CUTOFF

VIII Due to the complexity in making and calibrating measurement Z2E, KLYSTROM PW OUTPUT, it has been deleted.

IX The roll program is accomplished by ARMA signal, which function is monitored by measurement 1529V. Therefore measurement S1049X, PROGRAMMER ROLL SIGNAL HAS BEEN DELETED.

X Because there is no further test data needed on LOX slug transfer units at AMR, measurement N1314T, SLUG CHG LO_2 DISC has been deleted.

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 16F REPORT NO AZC-27-059-16 DATE 08 MAR 61 PAGE 1

	Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Subcarrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Cosiency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
1	3	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 46	44 46	47 51	53 ... 61	64 76	67 70	71	72	
		A			AIRFRAME														
R		A	282	T	LO2 FWD BLKHD Q1	1	11	45	150	800	DGF	12	SLO	55 01115 5		491	1	P	27-11891
B		A	294	T	LO2 FWD BLKHD Q3	1	11	41	150	800	DGR	4%	SLO	55 01115 5		491	3	P	27-11891
		A	409	T	BLACK CALOR QUAD II	3	10	5	0	1000	DGF	4%	SLO	27 11912 5		1269	1	P	27-11843
		A	412	T	BLACK CALOR QUAD IV	3	10	7	0	1000	DGF	4%	SLO	27 19912 5		1269	4	P	27-11843
		A	438	T	38 GM CALOR QUAD IV	3	10	9	0	1000	[illegible]	4%	SLO	27 19912 3		1269	4	P	27-11843
		A	439	T	38 GM CALOR QUAD I	3	10	11	0	1000	DGF	4%	SLO	27 19912 3		1269	1	P	7-11843
		A	440	T	19 GM CALOR QUAD IV	3	10	13	0	1000	DGF	4%	SLO	27 19912 1		1269	4	P	27-11843
		A	443	T	19 GM CALOR QUAD I	3	10	3	0	1000	DGF	4%	SLO	27 19912 1		1269	1	P	27-11843
		A	458	T	AIG POD AMBIENT SKIN	3	11	49	500	1500	DGR	40	SLO	CR/CN		1088	3	P	27-11846
		A	464	T	THST STRUCTURE Q180	3	10	1	0	1000	DGF	4%	SLO	CR/CN		1170	4	P	27-11843
		A	467	T	B2 HAT SECTION INBRD	3	10	37	0	1000	DGF	4%	SLO	CR/CN		1281	2	P	27-11843
		A	470	T	B2 HAT SECTION OBRD	2	10	17	0	1000	DGF	4%	SLO	CR/CN		1281	2	P	27-11843
		A	473	T	HEAT SHIELD OUTER	3	10	15	0	1000	DGF	4%	SLO	27 11843		1269	3	P	27-11843
		A	476	T	HEAT SHIELD INNER	3	10	3[illegible]	0	500	DGF	4%	SLO	CR/CN		1269	3	P	27-11843
		A	638	T	AFT SIDE A FRAME Q2	1	1[illegible]	[illegible]3	M100	300	DC[illegible]		SLO	27 01287 3	24959	1220	2	P	27-11793
		A	682	T	#1 AIG POD INSUL OUT	3	11	11	500	1500	DGR	40	SLO	CR/CN		1012	2	P	27-11846
		A	683	T	#1 AIG POD INSUL IN	3	11	13	500	1500	DGR	40	SLO	CR/CN		1012	2	P	27-11846
		A	684	T	#2 AIG POD INSUL OUT	3	11	15	500	1500	DGR	40	SLO	CR/CN		1051	2	P	27-11846
		A	685	T	#2 AIG POD INSUL IN	3	11	17	500	1500	DGR	40	SLO	CR/CN		1051	2	P	27-11846
		A	686	T	#3 AIG POD INSUL OUT	3	11	19	500	1500	DGR	40	SLO	CR/CN		1068	2	P	27-11846
		A	687	T	#3 AIG POD INSUL IN	3	11	21	500	1500	DGR	40	SLO	CR/CN		1068	2	P	27-11846
		A	689	T	#4 AIG POD INSUL OUT	3	11	23	500	1500	DGR	40	SLO	CR/CN		1086	3	P	27-11846
		A	689	T	#4 AIG POD INSUL IN	3	11	43	500	1500	DGR	40	SLO	CR/CN		1086	3	P	27-11846
		A	690	T	#5 AIG POD INSUL OUT	3	11	45	500	1500	DGR	40	SLO	CR/CN		1099	2	P	27-11846
		A	691	T	#5 AIG POD INSUL IN	3	11	47	500	1500	DGR	40	SLO	CR/CN		1099	2	P	27-11846
		A	692	T	B1 NACELLE INSUL FWD	3	10	19	500	1500	DGR	40	SLO	CR/CN		1143	4	P	27-11843
		A	693	T	B2 NACELLE INSUL FWD	3	10	21	500	1500	DGR	40	SLO	CR/CN		1143	3	P	27-11843
		A	694	T	B1 NACELLE INSUL CTR	3	10	23	500	1500	DGR	40	SLO	CR/CN		1196	4	P	27-11843
		A	695	T	B2 NACELLE INSUL CTR	3	10	31	500	1500	DGR	40	SLO	CR/CN		1196	2	P	27-11843
		A	696	T	B1 NACELLE INSUL AFT	3	10	33	500	1500	DGR	40	SLO	CR/CN		1213	4	P	27-11843
		A	697	T	B2 NACELLE INSUL AFT	3	10	35	500	1500	DGR	40	SLO	CR/CN		1213	2	P	27-11843

TF 7005-2 (REV 12-5[illegible])

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MISSILE INSTRUMENTATION LOG SHEET

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Vehicle (1)	System (2)	Measurement Number (3)	Type Measurement (4)	Description (5)	Telemeter No (6)	Sub-Carrier No (7)	Commutator Pin No (8)	Measurement Range Low (9)	Measurement Range High (9)	Units of Function (10)	Accuracy (11)	Rate of Change or Frequency of Function (12)	Type of Transducer (13)	Serial No. (14)	Station No. (15)	Quadrant (16)	Card Code (17)	Drawing Numbers
	A	933	T	AERC AFT SHLD CALOR	3	10	41	0	1300	DGF	4	SLO	FE/CN		1268	3	P	27-11923
	A	934	T	AERC AFT SHLD CALOR	3	10	43	0	1300	DGF	4	SLO	FE/CN		1 68	4	P	27-11923
	A	935	T	AERC AFT SHLD CALOR	3	10	45	0	1300	DGF	4	SLO	FE/CN		1268	4	P	27-11923
	D			RANGE SAFETY SYSTEM														
	D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC	3	STP					P	
	D	1	V	RSC CUTOFF OUTPUT	1	6	5	0	31	VDC	3	BLP					K	
	D	7	V	#1 RSC RF INPUT/AGC	1	A	9	15	100K	UV	5*	SLO		163			P	
	D	9	X	RSC DESTRUCT OUTPUT	2	E	95	0	30	VDC		STP					P	
	E			ELECTRICAL POWER SYS														
	E	50	Q	400 CYCLE AC PWRSUP	1	1		370	430	CPS	4	SLO		10			P	
	E	26	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC	1.0	SLO		10			P	
	E	91	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC	1.0	SLO		10			P	
	E	93	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC	1.0	SLO		10			P	
	F			PNEUMATIC SYSTEM														
	F	1	P	LOX TANK HELIUM	1	13	33	0	45	PIA	1.8	SLO	7 01723 11	5022	484	3	P	27-11679
	F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA	[illegible]	SLO	7 01723 13	5237	966	3	P	27-11683
B	F	34	P	FUEL PRESS ORFC DP	1	13	31	0	7	PID	0.3	SLO	27 01280 3		1127	1	P	27-11732
B	F	65	P	LOX TK HE LN @ ORFC	1	A	51	0	45	PIA	0.5	SLO	27 01243 5		1127	4	P	27-11732
	F	145	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA	175	SLO	7 01720 5	5655	1213	2	P	27-11650
B	F	147	P	LOX PRESS ORFC DP	1	A	49	0	5	PID	0.3	SLO	27 01280 1		1127	3	P	27-11732
B	F	212	P	FUEL PRESS ORFC IN	2	11	37	40	70	PIG	2.1	SLO	27 01243 7		1127	2	P	27-117 2
	F	246	P	B TANK HE BOTTLES dI	1	12	59	0	3500	PIA	105	SLO	7 01720 5	60675	1187	4	P	27-11682
	F	17	T	FUEL PRESS ORFC IN	1	11	43	0	500	DGF	12	SLO	7 31684 1		1120	1	P	27-11732
	F	97	T	LOX TK ULG STA 787	5	11	41	150	1050	DGR	48	SLO	CR/CN		787	2	P	27-11825

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 16E REPORT NO AZC-27-059-16 DATE 08 MAR 61 PAGE 3

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO.	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
3	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	72	
	F	115	T	LO2 PRESS REG INLET	1	11	3	M200	200	DGF		SLO	7 01686 3	P308	1205	4	P	27-11682
B	F	166	T	LOX PRESS ORFC IN	1	11	11	0	506	DGF	4%	SLO	7 01684 3		1121	3	P	27-11732
	F	247	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01633 5	103L	1221	4	P	27-11682
B	F	371	T	LOX TK ULG STA 691	3	11	53	150	1050	DGR	4%	SLO	CR/CN		691	2	P	27-11824
B	F	374	T	LOX TK ULG STA 807	3	11	1	150	1050	DGR	4%	SLO	CR/CN		807	2	P	27-11824
B	F	375	T	LOX TK ULG STA 827	3	11	3	150	1050	DGR	6%	SLO	CR/CN		827	2	P	27-11824
B	F	376	T	LOX TK ULG STA 846	3	10	47	150	1050	DGR	4%	SLO	CR/CN		846	2	P	27-11824
B	F	377	T	LOX TK ULG STA 867	3	10	49	150	1050	DGR	6%	SLO	CR/CN		867	2	P	27-11824
B	F	773	T	LOX TK ULG STA 540	3	11	31	150	1050	DGR	6%	SLO	CR/CN		540	2	P	27-11824
B	F	774	T	LOX TK ULG STA 570	3	11	33	150	1050	DGR	4%	SLO	CR/CN		570	2	P	27-11824
B	F	775	T	LOX TK ULG STA 600	3	11	35	150	1050	DGR	4%	SLO	CR/CN		600	2	P	27-11824
B	F	776	T	LOX TK ULG STA 630	3	11	51	150	1050	DGR	4%	SLO	CR/CN		630	2	P	27-11824
B	F	777	T	LOX TK ULG STA 660	3	11	37	150	1050	DGR	4%	SLO	CR/CN		660	2	P	27-11824
B	F	780	T	LOX TK ULG STA 720	3	11	39	150	1050	DGR	4%	SLO	CR/CN		720	2	P	27-11824
B	F	781	T	LOX TK ULG STA 740	3	1[illegible]	51	150	1050	DGR	4%	SLO	CR/CN		740	2	P	27-11024
B	F	782	T	LOX TK ULG STA 762	3	10	53	150	1050	DGR	4%	SLO	CR/CN		76[illegible]	2	P	27-11[illegible]4
	G			RADIO GUIDANCE SYS														
	G	50[illegible]	C	MOD III MAGNETRON	1	11	7	0	0.9	MA	.03	SLO					P	
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E	.65	SLO					P	
	G	503	V	MOD III PB AGC	1	11	17	0	M6.8	VDC	.15	SLO					P	
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
	H			HYDRAULIC SYSTEM														
	H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA	140	SLO	7 01731 9	5872	1173	1	P	27-11721
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA	45	SLO	7 01720 5	5664	1213	2	P	27-11650
	I			INERTIAL GUIDANCE														
	I	513	A	ACCEL XF1 DIRECT	3	C		M12	12	G							P	

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MISSILE INSTRUMENTATION LOG SHEET

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	VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
		I	514	A	ACCE XF2 DIRECT	3	E		M12	12	G							P	
		I	516	A	ACCELEROMETER YF1	2	A		M12	12	G							P	
		I	517	A	ACCELEROMETER ZF1	3	13		M12	12	G							P	
		I	519	A	ACCELEROMETER YF2	2	C		M12	12	G							P	
		I	520	A	ACCELEROMETER [illegible]2	3	A		M12	12	G							P	
		I	549	D	PITCH SERVO ERROR	2	6		M4.6	4.1	MIN		20					P	
		I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20					M	
A		I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	MIN		100					P	
		I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
		I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
		I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	[illegible].1	MIN		100					M	
		I	552	D	REDNDT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35					P	
		I	552	D	REDNDT GYRO PICK-OFF	2	11	23	M2.[illegible]	2.7	MIN		35					M	
		I	505	H	COMPUTER POSITION X	1	F	E	0	6K	NM		10K					P	
		I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
		I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
		I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	
		I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
		I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
		I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
		I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
		I	572	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
		I	591	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	
		I	592	T	GYRO 2	1	12	3	M6.3	6.3	DGC		SLO					P	
		I	593	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
		I	594	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
		I	595	T	COMPUTER	1	12	19	0	50	DGC		SLO					P	
		I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	

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MISSILE INSTRUMENTATION LOG SHEET

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CAGE CODE	DRAWING NUMBERS
	I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10						
	I	520	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
	I	520	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6					M	
	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
	I	540	V	CONTROL 115 PHASE B	1	12	21	0	130	VDC		SLO					P	
	I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
	I	543	V	COMPUTER M50 PSUP	3	9		M55	0	VDC		SLO					P	
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO						
	I	545	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
	I	547	V	COMPUTER 4 PSUP	1	13	43	0	6	VDC		SLO					P	
	I	546	V	COMPUTER 38 PSUP	1	12	41	0	42	VDC		SLO						
	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	
	I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
	I	510	W	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
	I	581	W	TIME I	2	8	S					BLP					P	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	521	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP					P	
	I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	522	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP					P	
	I	523	X	S&V COF RELAYS	2	10	S	OFF	ON			BLP					P	
	I	525	X	PRE ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
	I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
	I	527	X	PRE-ARM RELAY CLOS	1	12	38	OFF	ON			STP					P	
	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
	I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	M			MISCELLANEOUS														
A	M	78	A	MSL AXIAL ACCEL FINE	3	8		M.5	0.5	G	.05	20	87 93900 043	2066F	1037	A	R	27-11782
	M	143	D	BOOSTER SEPARATION	3	7		0	8	10	.25	16	7 0147A	1	123 1131	1	R	27-11723

FORM A1338-1

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SECTION 3
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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
														RU199				
	M	78	X	STROBE LIGHT OCCUR	1	C	95	OFF	ON	VDC		STC					P	
	P			PROPULSION SYSTEM														
	P	83	B	B2 PUMP SPEED	1	2		5680	6400	RPM	60	SLO	27 01267 1	47	1198	2	P	27-11722
	P	84	B	B1 PUMP SPEED	2	2		5680	6400	RPM	60	SLO	27 01267 1	84N	1198	4	P	27-11721
	P	349	B	S PUMP SPEED	1	3		9.9	11.2	KPM	.1	SLO	27 01264 3	50N	1234	3	P	27-11720
	P	528	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG	2	SLO	NAA				P	
	P	529	D	S MAIN O2 VLV	1	12	37	0	90	DEG	2	SLO	NAA		1205	X	P	
	P	6	F	S THRUST CHAMBER	2	E	1	0	1000	PIA	16	150	7 01731 5	7471	1235	1	P	27-11720
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA	40	SLO	7 01720 3	62965	1208	1	P	27-11651
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA	10	SLO	7 01737 3	1295	1127	4	P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA	10	SLO	7 01737 3	1537	1127	2	P	27-11699
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA	40	SLO	01720 3	3560	1208	1	P	27-11651
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA	40	15	7 01731 5	6047	1144	3	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	P91	40	15	7 01731 5	6400	1173	1	P	27-11721
	P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA	3.8	SLO	27 01243 9	773K	1235	1	P	27-11720
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA	18	15	7 01731 1	6680	1244	2	P	27-11684
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA	18	15	7 01731 1	5410	1244	1	P	27-11684
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA	15	SLO	7 01731 5	5407	1244	1	P	27-11684
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA	15	SLO	7 01731 5	6448	1244	2	P	27-11684
A	P	155	P	B1 GAS GEN COMBUSTON	1	12	25	0	1000	PIA	25	SLO	7 01731 5	6583	1173	1	P	27-11721
A	P	184	P	B2 GAS GEN COMBUSTON	1	12	33	0	1000	PIA	25	SLO	7 01731 5	5653	1144	3	P	27-11722
A	P	279	P	B2 LO2 PR LUB OIL MN	2	11	43	0	125	PIA	5	SLO	27 01243 9	9K230	1144	3	P	27-11722
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA	38	15	7 01731 7	72858	1235	1	P	27-11720
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA	25	SLO	7 01731 5	7558	1235	1	P	27-11720
A	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA	38	SLO	7 01731 7	62488	1235	1	P	27-11720
A	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA	15	SLO	7 01731 5	74778	1235	1	P	27-11720
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PI6	5	SLO	27 01243 9	22225	1113	1	P	27-11721
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01669 11	857	1197	3	P	27-11720

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
A	P	671	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	27 01287 3	2A964	1222	4	P	27-11793
	P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 01247 3	104L	1234	A	P	27-11720
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247 3	75L	1210	1	P	27-11721
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247 3	88L	1210	3	P	27-11722
	P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	P	547	X	B1 CUTOFF RELAY	1	7	5	0	28	VDC		STP					P	
	P	548	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP					P	
	S			AUTOPILOT SYSTEM														
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG	.2	5		6			P	
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG	.2	3		6			P	
	S	63	D	YAW DISPL GYRO SIG	1	A	15	M3	3	DEG	.2	5		6			P	
	S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG	.5	10	7 01680 7	901	1212	1	P	
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG	.5	30	7 01680 7	901	1212	Y	M	27-11721
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG	.5	10	01680 7	970	1212	2	P	27-11722
	S	205	D	B1 YAW	1	6		M5	5	DEG	.5	10	7 01680 7	959	1212	4	P	
	S	205	D	B1 YAW	2	11	5	M5	5	DEG	.5	30	7 01680 7	959	1212	4	M	27-11721
	S	206	D	B2 YAW	2	E	19	M5	5	DEG	.5	10	7 01680 7	880	1212	2	P	27-11722
	S	222	D	V1 PITCH	2	E	7	0	50	DEG	1	10	7 01616 1	08220	1123	4	P	27-11699
	S	223	D	V2 PITCH	2	E	5	0	50	DEG	1	10	7 01616 1	07705	1123	2	P	27-11699
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG	7	10	27 01205 1	342M	1129	4	P	27-11699
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG	7	10	27 01205 1	337M	1129	2	P	27-11699
	S	236	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG	.3	6	7 01680 9	774	1210	1	P	
	S	236	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG	.3	30	7 01680 9	774	1210	1	M	27-11720
	S	237	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG	.3	6	7 01680 3	539	1210	2	P	
	S	237	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG	.3	30	7 01680 3	539	1210	2	M	27-11720
	S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S	.3	15		6			P	
	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S	.3	15		6			M	
	S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S	.3	15		6			P	
	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S	.3	15		6			M	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No	Quadrant	Card Code	Drawing Numbers
	S	56	R	YAW RATE GYRO SIG	1	6		M6	6	D/S	.3	15		6			P	
	S	56	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S	.3	15		6			M	
	S	268	X	A/P PG SWITCH 17	1	13	3	OFF	ON	VDC		STP					P	
	T			TELEMETERING SYSTEM														
A	T	A	T	ARMA T/C REF JUNCT	1	11	23	0	200	DGF	8	SLO	27 01287 1		1055	2	P	27-11046
A	T	103	T	BOOSTER T/C REF	1	11	10	0	200	DGF	8	SLO	27 01287 1		1180	4	P	27-11043
	U			PROPELLANT UTILIZ														
	U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID		SLO	27 01280 1	80017	948	3	P	27-11683
	U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01280 1	471	948	3	P	27-11683
	U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC	.5	SLO		10			P	
	Y			DECOY SYSTEM														
A	Y	102	L	EJECTION VELOCITY	2	E	75	ON	OFF								P	
	Y	102	L	EJECTION VELOCITY	3	12	11	ON	OFF								P	
	Y	156	V	BATTERY VOLTAGE	3	12	9	ON	OFF								P	
	Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
	Y	103	X	BAROSWITCH	3	12	1	ON	OFF								P	
	Y	104	X	TIMER START CYCLE	3	12	1	ON	OFF								P	
	Y	105	X	BOOSTER ACCEL CYCLE	3	12	1	ON	OFF								P	
	Y	106	X	SUSTAINER HALF CYCLE	3	12	1	ON	OFF								P	
	Y	141	X	EJECT SURE SIG	2	E	85	ON	OFF								P	
	Y	141	X	EJECT SURE SIG	3	12	11	ON	OFF								P	
	Y	150	X	FAIRING RELEASE	3	12	3	ON	OFF								P	
	Y	151	X	UNLATCH SIGNAL	3	12	3	ON	OFF								P	
	Y	152	X	MOTOR START SIGNAL	3	12	3	ON	OFF								P	
	Y	153	X	EJECT SIGNAL	3	12	3	ON	OFF								P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARR. NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CF 3D CODE	DRAWING NUMBERS
	Y	154	X	TUBE ORIENTATION	3	12	5	ON	OFF								P	
	Y	155	X	TUBE UNLATCH	3	12	7	ON	OFF								P	
	Z			AZUSA SYSTEM														
	Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM	5*	3		35			P	

SECTION 9

MISSILE INSTRUMENTATION BY CHANNEL

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by channel.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

UNITS OF FUNCTION

A	P	29	P	V2 THRUST CHAMBER	1	11	5	0	400	PIA		SLO	7	01737	1		1128	2		P	27-11614
A	F	173	P	B CTL PNEU REG OUT	1	11	7	0	1000	FIA		SLO	7	01731	3		1243	4		P	27-16500
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA		SLO	7	01723	13		925	Y		P	27-11609
A	P	671	T	TH SECT AMB QUAD 4	1	11	11	100	700	DGF		SLO	7	01684	9		1230	4		P	27-11599

MEASUREMENT NUMBER

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number for the applicable measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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Vehicle System	Measurement Number	Type Measurement	Description	Telemeter No	Subcarrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Ser. No	Station No	Quadrant	Card Code	Drawing Number
			COMM. RATE-CONT.	1	0	0											
E	50	Q	400 CYCLE AC PWRSUP	1	1		370	430	CPS	4	SLO		10			P	
P	83	B	B2 PUMP SPEED	1	2		5680	6400	RPM	60	SLO	27 01267 1	47	1198	2	P	27-11722
P	349	B	S PUMP SPEED	1	3		9.9	11.2	KPM	.1	SLO	27 01264 3	508	1234	3	P	27-11720
S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG	.3	6	7 01680 9	774	1210	1	P	27-11720
S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG	.3	6	7 01680 3	539	1210	2	P	27-11720
S	205	D	B1 YAW	1	6		M5	5	DEG	.5	10	7 01680 7	959	1212	4	P	27-11721
D	1	V	RSC CUTOFF OUTPUT	1	6	S	0	31	VDC	3	BLP					M	
S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG	.5	10	7 01680 7	901	1212	1	P	27-11721
P	547	X	B1 CUTOFF RELAY	1	7	S	0	28	VDC		STP					P	
S	54	R	YAW RATE GYRO SIG	1	8		M6	6	D/S	.3	15		6			P	
S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S	.3	15		6			P	
S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S	.3	15		6			P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Master No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Unit of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No	Quadrant	Caps Code	Drawing Numbers
				COMM. RATE 2.5 RPS	1	11	6											
					1	11	1											
	G	582	E	MOD III RB RF OUTPUT	1	11	3	0	15	E	.65	SLO					P	
	F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01684 3	B208	1205	4	P	27-11662
	G	504		MOD III MAGNETRON	1	11	7	0	0.5	MA	.03	SLO					P	
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	257	1197	3	P	27-11720
B	F	146	T	LOX PRESS ORFC IN	1	11	11	0	500	DGF	6%	SLO	7 01684 3		1121	3	P	27-11732
	A	635	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3	24958	1220	2	P	27-11793
					1	11	15											
	G	503	V	MOD III RB AGC	1	11	17	0	M4.8	VDC	.15	SLO					P	
A	T	103	T	BOOSTER T/C REF	1	11	19	0	200	DGF	8	SLO	27 01287 1		1180	4	P	27-11843
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
A	T	4	T	ARMA T/C REF JUNCT	1	11	23	0	200	DGF	8	SLO	27 01287 1		1055	2	P	27-11846
				100% CAL	1	11	25											
				0% CALIB	1	11	27											
				0% CALIB	1	11	29											
					1	11	31											
	G	582	E	CONNECTED TO 1 11 3	1	11	33											
	F	247	T	E TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01633 5	103L	1221	4	P	27-11682
	G	504	C	CONNECTED TO 1 11 7	1	11	37											
A	P	571	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	27 01287 3	24964	1222	4	P	27-11793
B	A	294	T	LO2 FWD BLKHD Q3	1	11	41	150	800	DGR	4%	SLO	55 01115 5		491	3	P	27-11851
B	F	17	T	FUEL PRESS ORFC IN	1	11	43	0	500	DGF	12	SLO	7 01684 3		1120	1	P	27-11732
B	A	287	T	LO2 FWD BLKHD Q1	1	11	45	150	800	DGF	12	SLO	55 01115 5		491	1	P	27-11851
	G	503	V	CONNECTED TO 1 11 17	1	11	47											
					1	11	49											
	G	579	V	CONNECTED TO 1 11 21	1	11	51											
					1	11	53											
				SYNC & 100% CALIB	1	11	55											
				CONNECTED TO 1 11 55	1	11	56											
				CONNECTED TO 1 11 56	1	11	57											
				CONNECTED TO 1 11 57	1	11	58											
				CONNECTED TO 1 11 58	1	11	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
1	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	49 51	52 53 54-58 59-61	62 66	67 70	71	72	
				COMM. RATE 5 BPS	1	12	0											
	I	531	Y	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	
	I	532	Y	GYRO 2	1	12	3	M6.3	6.3	DGC		SLO					P	
	I	553	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
					1	12	7											
					1	12	9											
	I	540	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		SLO					P	
	I	554	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
	I	572	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
	F	145	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA	175	SLO	7 01720 5	5635	1213	2	P	27-11650
	I	555	T	COMPUTER	1	12	19	0	50	DGC		SLO					P	
	I	541	V	CONTROL N22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
A	P	185	P	B1 GAS GEN COMBUSTON	1	12	23	0	1000	PIA	25	SLO	7 01731 5	6585	1173	1	P	27-11721
				100% CALIB	1	12	25											
				0% CALIB	1	12	27											
				50% CALIB	1	12	29											
					1	12	31											
A	P	184	P	B2 GAS GEN COMBUSTON	1	12	33	0	1000	PIA	25	SLO	7 01731 5	5653	1144	3	P	27-11722
	I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
	P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG	2	SLO	NAA		1205	X	P	
	I	544	V	COMPUTER N16.5 PSUP	1	12	39	N20	0	VDC		SLO					P	
	I	546	V	COMPUTER 38 PSUP	1	12	41	0	42	VDC		SLO					P	
	H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA	140	SLO	7 01731 9	5872	1173	1	P	27-11721
	I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
	I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA	45	SLO	7 01720 5	5664	1213	2	P	27-11650
	F	266	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA	105	SLO	7 01726 5	60675	1187	4	P	27-11662
				SYNC & 100% CALIB	1	12	55											
				CONNECTED TO 1 12 55	1	12	56											
				CONNECTED TO 1 12 56	1	12	57											
				CONNECTED TO 1 12 57	1	12	58											
				CONNECTED TO 1 12 58	1	12	59											

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	VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO	QUADRANT	ID CODE	DRAWING NUMBERS
	1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
					COMM. RATE 5 RPS	1	13	0											
						1	13	1											
		G	268	X	A/P PG SWITCH 17	1	13	3	OFF	ON	VDC		STP					P	
		P	540	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP					P	
		D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC	3	STP					2	
		P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
		E	28	V	MSL SYSTEMS INPUT	1	13	11	0	30	VDC	1.0	SLO		10			P	
		P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA	40	SLO	7 01720 3	3560	1208	1	*	27-11651
		P	92	P	E2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA	15	SLO	7 01731 5	6468	1264	2	P	27-11684
		P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA	3.8	SLO	27 01263 9	773K	1235	1	P	27-11720
						1	13	19											
		U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01280 1	471	948	3	P	27-11683
		E	93	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC	1.0	SLO		10			P	
					100% CALIB	1	13	25											
					0% CALIB	1	13	27											
					50% CALIB	1	13	29											
		U	80	P	LO2 TANK HEAD	1	13	31	0	3	PID		SLO	27 01280 1	80017	968	3	P	27-11683
		F	1	P	LO2 TANK HELIUM	1	13	33	0	45	PIA	1.0	SLO	7 01723 11	5022	484	3	P	27-11679
						1	13	35											
		F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA	3	SLO	7 01723 13	9257	968	3	P	27-11683
		P	91	P	E1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA	15	SLO	7 01731 5	7	1264	1	P	27-11684
		I	565	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
		I	567	V	COMPUTER 6 PSUP	1	13	43	0	6	VDC		SLO					P	
						1	13	45											
		P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA	40	SLO	7 01720 3	62965	1208	1	P	27-11651
A		P	361	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA	15	SLO	7 01731 5	74798	1278	1	P	27-11720
B		F	34	P	FUEL PRESS ORFC DP	1	13	51	0	7	PID	0 [illegible]	SLO	27 01280 3		1127	1	P	27-11732
		E	93	V	CONNECTED TO 1 13 23	1	13	53											
					SYNC & 100% CALIB	1	13	55											
					CONNECTED TO 1 13 55	1	13	56											
					CONNECTED TO 1 13 56	1	13	57											
					CONNECTED TO 1 13 57	1	13	58											
					CONNECTED TO 1 13 58	1	13	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 10 RPS	1	A	0											
	E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC	1.0	SLO		10			P	
					1	A	3											
	D	7	V	#1 BSC RF INPUT/AGC	1	A	5	15	100K	UV	5*	SLO		163			P	
	U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC	.5	SLO		10			P	
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG	.2	5		6			P	
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG	.2	5		6			P	
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG	.2	5		6			P	
					1	A	15											
	Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM	5*	3		35			P	
	Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
					1	A	21											
					1	A	23											
				100% CALIB	1	A	25											
				0% CALIB	1	A	27											
				50% CALIB	1	A	29											
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA	25	SLO	7 01731 5	7558	1235	1	P	27-11729
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA	10	SLO	7 01737 3	1295	1127	4	P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA	10	SLO	7 01737 3	1537	1127	2	P	27-11699
	U	91	V	CONNECTED TO 1 A 7	1	A	37											
	S	61	D	CONNECTED TO 1 A 9	1	A	39											
	S	62	D	CONNECTED TO 1 A 11	1	A	41											
	S	63	D	CONNECTED TO 1 A 13	1	A	43											
	P	528	D	S MAIN FUEL VALVE	1	A	45	0	90	DEG	2	SLO	NAA				P	
	Z	3	E	CONNECTED TO 1 A 17	1	A	47											
B	F	147	P	LOX PRESS ORFC DP	1	A	49	0	5	PID	0.1	SLO	27 012[illegible] 1		1127	3	P	27-11732
B	F	65	P	LOX TK HE LN @ ORFC	1	A	51	0	45	PIA	0.3	SLO	27 01243 5		1127	4	P	27-11732
					1	A	53											
				SYNC & 100% CALIB	1	A	55											
				CONNECTED TO 1 A 55	1	A	56											
				CONNECTED TO 1 A 56	1	A	57											
				CONNECTED TO 1 A 57	1	A	58											
				CONNECTED TO 1 A 58	1	A	59											

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE 1/8 RPS	1	C	0											
	M	78	X	STROBE LIGHT OCCUR	1	C	25	OFF	ON	VDC		STP					P	
				DIGITAL CHANNEL	1	E	0											
	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	6K	F/S		10K					P	
	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
	I	510	M	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
	I	505	M	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
	I	506	M	COMPUTER POSITION Y	1	E	F	M300	300	NM		10K					P	
	I	507	M	COMPUTER POSITION Z	1	E	G	0	760	NM		10K					P	
	I	509	M	AZM ERROR FUNCTION	1	E	H	M300	300	NM		10K					[illegible]	
	I	508	M	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	

[illegible]

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE CONT.	2	0	0											
					2	1												
	P	84	B	B1 PUMP SPEED	2	2		5680	6400	RPM	60	SLO	7 01267 1	BAM	1198	A	P	27-11721
	I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
	I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	
	I	549	D	PITCH SERVO ERROR	2	6		M4.1	4.1	MIN		20					P	
	I	521	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP					P	
	I	552	D	REDNDT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35					P	
	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	
	I	581	W	TIME T	2	8	S					BLP					P	
A	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	MIN		100					P	
	I	522	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP					P	
	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
	I	523	X	56V COF RELAYS	2	10	S	OFF	ON			BLP					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE 2.5 RPS	2	11	0											
	S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG	.3	30	7 01680 9	774	1210	1	M	27-11720
	S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG	.3	30	7 01680 5	539	1210	2	M	.7-11720
	S	205	D	B1 YAW	2	11	5	M5	5	DEG	.5	30	7 01680 7	259	1212	4	M	27-11721
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG	.5	30	7 01680 7	901	1212	Y	M	27-11721
	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S	.3	15		6			M	
	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S	.3	15		6			M	
	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S	.3	15		6			M	
	I	529	V	ROLL [illegible]OLVER SIG	2	11	15	M10	10	VAC		6					M	
	I	530	V	PITC[illegible] SOLVER SIG	2	11	17	M30	30	VAC		10					M	
	I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10					M	
	I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20					M	
	I	552	D	REDNDT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
				100% CALIB	2	11	25											
				0% CALIB	2	11	27											
				50% CALIB	2	11	29											
	I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
	I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
	I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100					M	
B	F	212	P	FUEL PRESS ORFC IN	2	11	[illegible]	40	70	PIG	2.1	SLO	27 0124[illegible] 7		1127	2	P	27-11732
					2	11	39											
					2	11	41											
A	P	279	P	B2 LO2 PR LUB OIL MN	2	11	43	0	125	PIA	5	SLO	27 01243 9	9K230	1144	3	P	27-11722
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIG	5	SLO	27 01243 9	30005	1173	1	P	27-11721
A	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA	30	SLO	7 01731 7	62400	1235	1	P	27-11..5
					2	11	49											
					2	11	51											
					2	11	53											
				SYNC & 100% CALIB	2	11	55											
				CONNECTED TO 2 11 55	2	11	56											
				CONNECTED TO 2 11 5[illegible]	2	11	57											
				CONNECTED TO 2 11 57	2	11	58											
				CONNECTED TO 2 11 58	2	11	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE CONT.	2	A	0											
	I	516	A	ACCELEROMETER YF1	2	A		M12.	12	G							B	
	I	519	A	ACCELEROME.ER .Z2	2	C		M12.	12	G							B	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 30 RPS	2	E	0											
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA	16	150	7 01731 5	7471	1235	1	P	27-11720
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA	30	15	7 01731 7	72898	1235	1	P	27-11720
	S	223	D	V2 PITCH	2	E	5	0	50	DEG	3	10	7 01616 1	07705	1123	2	P	27-11699
	S	222	D	V1 PITCH	2	E	7	0	50	DEG	3	10	7 01616 1	05220	1123	4	P	27-11699
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA	18	15	7 01731 1	5610	1266	1	P	27-11684
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA	18	15	7 01731 1	6680	1266	2	P	27-11684
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG	7	10	27 01205 1	342M	1129	4	P	27-11699
	S	206	D	B2 PITCH ROLL	2	E	15	M5	5	DEG	.5	10	7 01680 7	970	1212	2	P	27-11722
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG	7	10	27 01205 1	337M	1129	2	P	27-11699
	S	206	D	B2 YAW	2	E	19	M5	5	DEG	.5	10	7 01680 7	880	1212	2	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	PSI	40	15	7 01731 5	6600	1173	1	P	27-11721
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA	40	15	7 01731 5	6047	1166	3	P	27-11722
				100% CALIB	2	E	25											
				0% CALIB	2	E	27											
				50% CALIB	2	E	29											
	P	6	P	CONNECTED TO 2 E 1	2	E	31											
	P	330	P	CONNECTED TO 2 E 3	2	E	33											
	S	223	D	CONNECTED TO 2 E 5	2	E	35											
	S	222	D	CONNECTED TO 2 E 7	2	E	37											
	P	60	P	CONNECTED TO 2 E 9	2	E	39											
	P	59	P	CONNECTED TO 2 E 11	2	E	41											
	S	233	D	CONNECTED TO 2 E 13	2	E	43											
	S	206	D	CONNECTED TO 2 E 15	2	E	45											
	S	234	D	CONNECTED TO 2 E 17	2	E	47											
	S	206	D	CONNECTED TO 2 E 19	2	E	49											
	P	39	P	CONNECTED TO 2 E 21	2	E	51											
	P	38	P	CONNECTED TO 2 E 23	2	E	53											
				SYNC & 100% CALIB	2	E	55											
				CONNECTED TO 2 E 55	2	E	56											
				CONNECTED TO 2 E 56	2	E	57											
				CONNECTED TO 2 E 57	2	E	58											
				CONNECTED TO 2 E 58	2	E	59											
	Y	[illegible]	L	[illegible] VELOCITY	2	E	[illegible]	[illegible]	[illegible]								[illegible]	
	Y	[illegible]	[illegible]	[illegible]	2	E	[illegible]	[illegible]	[illegible]								[illegible]	
	D	3	X	[illegible]	2	E	[illegible]	A	[illegible]	[illegible]		[illegible]						

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	VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
					COMM. RATE CONT.	3	0	0											
						3	1												
						3	2												
						3	3												
						3	4												
A		M	29	A	MA AXIAL ACCEL FINE	3	5		-0.5	0.5	G	.05	20	87 93900 063	2066F	1057.4		P	27-11782
						3	6												
		M	5A3	D	BOOSTER SEPARATION	3	7		0	8	IN	.25	16	7 01676	1 0133	1131.1		P	27-11723
						3	8												
		1	5A3	V	COMPUTER N50 PSUP	3	9		-.05	8	VDC		SLO					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Number
				COMM. RATE 2.5 RPS	3	10	0											
	A	446	T	INST STRUCTURE OTBD	3	10	1	0	1000	DGF	4%	SLO	CR/CN		1170	4	P	27-11843
	A	443	T	19 GM CALOR QUAD I	3	10	3	0	1000	DGF	4%	SLO	27 19912	1	1269	1	P	27-11843
	A	409	T	BLACK CALOR QUAD II	3	10	5	0	1000	DGF	4%	SLO	27 11912	5	1269	1	P	27-11843
	A	412	T	BLACK CALOR QUAD IV	3	10	7	0	1000	DGF	4%	SLO	27 19912	5	1269	4	P	27-11843
	A	438	T	38 GM CALOR QUAD IV	3	10	9	0	1000	DGF	4%	SLO	27 19912	3	1269	4	P	27-11843
	A	439	T	38 GM CALOR QUAD I	3	10	11	0	1000	DGF	4%	SLO	27 19912	3	1269	1	P	27-11843
	A	440	T	19 GM CALOR QUAD IV	3	10	13	0	1000	DGF	4%	SLO	27 19312	1	1269	4	P	27-11843
	A	473	T	HEAT SHIELD OUTER	3	10	15	0	1000	DGF	4%	SLO	27 11843		1269	3	P	27-11843
	A	470	T	B2 HAT SECTION OTBRD	3	10	17	0	1000	DGF	4%	SLO	CR/CN		1281	2	P	27-11843
	A	692	T	B1 NACELLE INSUL FWD	3	10	19	500	1500	DGR	40	SLO	CR/CN		1143	4	P	27-11843
	A	693	T	B2 NACELLE INSUL FWD	3	10	21	500	1500	DGR	40	SLO	CR/CN		1143	3	P	27-1184?
	A	694	T	B1 NACELLE INSUL CTR	3	10	23	500	1500	DGR	40	SLO	CR/CN		1196	4	P	27-11843
				100% CALIB	3	10	25											
				0% CALIB	3	10	27											
				0% CALIB	3	10	29											
	A	695	T	B2 NACELLE INSUL CTR	3	10	31	500	1500	DGR	40	SLO	CR/CN		1196	2	P	27-11843
	A	696	T	B1 NACELLE INSUL AFT	3	10	33	500	1500	DGR	40	SLO	CR/CN		1213	4	P	27-11843
	A	697	T	B2 NACELLE INSUL AFT	3	10	35	500	1500	DGR	40	SLO	CR/CN		1213	2	P	27-11843
	A	447	T	B2 HAT SECTION INBRD	3	10	37	0	1000	DGF	4%	SLO	CR/CN		1281	2	P	27-118??
	A	476	T	HEAT SHIELD INNER	3	10	39	0	500	DGF	4%	SLO	CR/CN		1269	3	P	27-11843
	A	933	T	AEDC AFT SHLD CALOR	3	10	41	0	1300	DGF	4	SLO	FE/CN		1268	3	P	27-11923
	A	934	T	AEDC AFT SHLD CALOR	3	10	43	0	1300	DGF	4	SLO	FE/CN		1268	4	P	27-11923
	A	93[illegible]		AEDC AFT SHLD CALOR	3	10	45	0	1300	DGF	4	SLO	FE/CN		1268	4	P	-11923
B	F	376	T	LOX TK ULG STA 846	3	10	47	1[illegible]	1050	DGR	4%	SLO	CR/CN		846	2	P	27-11826
B	F	377	T	LOX TK ULG STA 847	3	10	49	150	1050	DGR	4%	SLO	CR/CN		847	2	P	27-11826
B	F	781	T	LOX TK ULG STA 740	3	10	51	150	1050	DGR	4%	SLO	CR/CN		740	2	P	27-11826
B	F	782	T	LOX TK ULG STA 762	3	10	53	150	1050	DGR	4%	SLO	CR/CN		762	2	P	27-11826
				SYNC & 100% CALIB	3	10	55											
				CONNECTED TO 3 10 55	3	10	56											
				CONNECTED TO 3 10 56	3	10	57											
				CONNECTED TO 3 10 57	3	10	58											
				CONNECTED TO 3 10 58	3	10	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUBCARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNC	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBER
				COMM. RATE 4.2 KPS	3	11	0											
B	F	374	T	LOX TK ULG STA 807	3	11	1	150	1050	DGR	4%	SLO	CR/CN		807	Z	P	27-11824
B	F	375	T	LOX TK ULG STA 827	3	11	3	150	1050	DGR	4%	SLO	CR/CN		827	Z	P	27-11824
	P	713	T	#1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247	3. 75L	1210	1	P	27-11721
	P	714	T	#2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247	3. 88L	1210	3	P	27-11722
	P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 01247	3. 104L	1234	4	P	27-11720
	A	682	T	#1 AIG POD INSUL OUT	3	11	11	500	1500	DGR	40	SLO	CR/CN		1012	2	P	27-11846
	A	683	T	#1 AIG POD INSUL IN	3	11	13	500	1500	DGR	40	SLO	CR/CN		1012	2	P	27-11846
	A	684	T	#2 AIG POD INSUL OUT	3	11	15	500	1500	DGR	40	SLO	CR/CN		1051	2	P	27-11846
	A	685	T	#2 AIG POD INSUL IN	3	11	17	500	1500	DGR	40	SLO	CR/CN		1051	2	P	27-11846
	A	686	T	#3 AIG POD INSUL OUT	3	11	19	500	1500	DGR	40	SLO	CR/CN		1068	2	P	27-11846
	A	687	T	#3 AIG POD INSUL IN	3	11	21	500	1500	DGR	40	SLO	CR/CN		1068	2	P	27-11846
	A	688	T	#4 AIG POD INSUL OUT	3	11	23	500	1500	DGR	40	SLO	CR/CN		1086	3	P	27-11846
				100% CALIB	3	11	25											
				0% CALIB	3	11	27											
				0% CALIB	3	11	29											
B	F	773	T	LOX TK ULG STA 540	3	11	31	150	1050	DGR	4%	SLO	CR/CN		540	Z	P	27-11824
B	F	774	T	LOX TK ULG STA 570	3	11	33	150	1050	DGR	4%	SLO	CR/CN		570	Z	P	27-11824
B	F	775	T	LOX TK ULG STA 600	3	11	35	150	1050	DGR	4%	SLO	CR/CN		600	Z	P	27-11824
B	F	777	T	LOX TK ULG STA 660	3	11	37	150	1050	DGR	4%	SLO	CR/CN		660	Z	P	27-1182
B	F	780	T	LOX TK ULG STA 720	3	11	39	150	1050	DGR	4%	SLO	CR/CN		720	Z	P	27-11824
B	F	97	T	LOX TK UL STA 787	3	11	41	150	1050	DGR	4%	SLO	CR/CN		787	Z	P	27-11824
	A	689	T	#4 AIG POD INSUL IN	3	11	43	500	1500	DGR	40	SLO	CR/CN		1086	3	P	27-11846
	A	690	T	#5 AIG POD INSUL OUT	3	11	45	500	1500	DGR	40	SLO	CR/CN		1099	2	P	27-11846
	A	691	T	#5 AIG POD INSUL IN	3	11	47	500	1500	DGR	40	SLO	CR/CN		1099	2	P	27-11846
	A	458	T	AIG POD AMBIENT SKIN	3	11	49	500	1500	DGR	40	SLO	CR/CN		1087	3	P	27-11846
B	F	776	T	LOX TK ULG STA 630	3	11	51	150	1050	DGR	4%	SLO	CR/CN		630	Z	P	[illegible] 1182
B	F	371	T	LOX TK ULG STA 691	3	11	53	150	1050	DGR	4%	SLO	CR/CN		691	Z	P	27-1182
				SYNC & 100% CALIB	3	11	[illegible]											
				CONNECTED TO 3 11 55	3	11	56											
				CONNECTED TO 3 11 56	3	11	57											
				CONNECTED TO 3 11 57	3	11	58											
				CONNECTED TO 3 11 58	3	11	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TRANSMITTER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 5 RPS	3	12	0											
	Y	103	X	BAROSWITCH	3	12	1	ON	OFF								P	
	Y	104	X	TIMER START CYCLE	3	12	1	ON	OFF								P	
	Y	105	X	BOOSTER ACCEL CYCLE	3	12	1	ON	OFF								P	
	Y	106	X	SUSTAINER HALF CYCLE	3	12	1	ON	OFF								P	
	Y	150	X	FAIRING RELEASE	3	12	3	ON	OFF								P	
	Y	151	X	UNLATCH SIGNAL	3	12	3	ON	OFF								P	
	Y	152	X	MOTOR START SIGNAL	3	12	3	ON	OFF								P	
	Y	153	X	EJECT SIGNAL	3	12	3	ON	OFF								P	
	Y	154	X	TUBE ORIENTATION	3	12	5	ON	OFF								P	
	Y	155	X	TUBE UNLATCH	3	12	7	ON	OFF								P	
	Y	156	V	BATTERY VOLTAGE	3	12	9	ON	OFF								P	
	Y	102	L	EJECTION VELOCITY	3	12	11	ON	OFF								P	
	Y	161	X	EJECT SURE SIG	3	12	11	ON	OFF								P	
					3	12	13											
					3	12	15											
					3	12	17											
					3	12	19											
					3	12	21											
					3	12	23											
				XDCR-VOLT CALIB	3	12	25											
				0% CALIB	3	12	27											
				0% CALIB	3	12	29											
					3	12	31											
					3	12	33											
					3	12	35											
					3	12	37											
					3	12	39											
					3	12	41											
					3	12	43											
					3	12	45											
					3	12	47											
					3	12	49											

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Vehicle System	Measurement Number	Type Measurement	Description	Telemeter No	Subcarrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				3	12	51											
				3	12	53											
			SYNC & 100% CALIB	3	12	55											
			CONNECTED TO 3 12 55	3	12	56											
			CONNECTED TO 3 12 56	3	12	57											
			CONNECTED TO 3 12 57	3	12	58											
			CONNECTED TO 3 12 58	3	12	59											

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[illegible]	[illegible]	Measurement Number	Type Measurement	DESCRIPTION	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
				COMM. RATE CONT.	3	13	C											
	1	517	A	ACCELEROMETER ZF1	3	13		M12	12	G							P	
	1	520	A	ACCELEROMETER ZF2	3	A		M12	12	G							P	
	1	513	A	ACCEL XF1 DIRECT	3	C		M12	12	G							P	
	1	514	A	ACCEL XF2 DIRECT	3	E		M12	12	G							P	

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SECTION 10

LANDLINE INSTRUMENTATION

The Landline Instrumentation presented in this section contains the latest available characteristics of the individual measurements. In addition the type of recordings indicated.

VEHICLE

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

FREQUENCY RESPONSE

Denotes the frequency response requirements in cps of the instrumentation system for the measurement.

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated description of the measurement.

UNITS OF FUNCTION

TRANSDUCER SERIAL NUMBER

A	F	1125	P	B CTL PNEU REG OUT	S	200	800	PIA	16	SLO	7	01731	3	2841	1243	4	27-16500
A	F	1194	P	FACILITY GN_2 SUPPLY	S	0	2400	PIG	48	SLO							
A	F	1286	P	S1 PNEU REG OUT	S	0	800	PIA	10	SLC	7	01720	1		1223	2	27-16505
A	G	1026	V	PITCH ANALOG	D	M30	30	VDC	0.2	SLO							27-0001-3

MEASUREMENT NUMBER

ACCURACY REQUIREMENT

Present in units of the function measured.

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

RECORDER ASSIGNMENT

This code defines the method to be utilized to record the measurement. A double letter here indicates that this measurement will be recorded on two different types of recorders.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
	D			RANGE SAFETY SYSTEM														
	D	5142	V	RSC #1 BAT DC	M												P	
	D	5143	V	RSC #2 BAT DC	M												P	
	D	5140	W	RSC #1 TOTAL TIMER	M			0	1000	HR							P	
	D	5141	W	RSC #2 TOTAL TIMER	M			0	1000	HR							P	
	D	5150	W	RSC #1 & 2 BATTERY	M			0	1000	HR							P	
	E			ELECTRICAL POWER SYS														
	E	5066	C	MISSILE DC AMPS	M			0	200	AMP							P	
	E	5068	C	EMERGENCY GENERATOR	M			0	200	AMP							P	
	E	5005	Q	INVERTER FREQUENCY	M			350	450	CPS							P	
	E	5029	Q	MISSILE EXT PHASE A	M			350	450	CPS							P	
	E	5031	Q	PHASE A EXT @ MSL	M			396	404	CPS							P	
	E	5003	V	BATTERY OUTPUT	M			15	35	VDC							P	
	E	5006	V	INVERTER PHASE A	M			90	140	VAC							P	
	E	5022	V	MISSILE AC EXT @ MSL	M			110	120	VAC							P	
	E	5023	V	MISSILE EXTERNAL AC	M			110	120	VAC							P	
	E	5030	V	MISSILE DC EXT @ MSL	M			0	40	VDC							P	
	E	5065	V	MISSILE EXTERNAL DC	M			0	40	VDC							P	
	E	5109	W	MAIN MSL BATT TIMER	M												P	
	E	5110	W	INVERTER TIMER	M												P	
	F			PNEUMATIC SYSTEM														
	F	1309	D	GND LOX TK VENT VLV	R			OPEN	CLS			SLO					P	
	F	1[illegible]01	P	LO2 TANK HELIUM	O			0	50	PSI	1	SLO	27 01243 5	5022	404	3	P	27-11679

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MISSILE 26E L/L   REPORT NO AZC-27-059-16   DATE 08 MAR 61   PAGE 2

	Vehicle	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	F	5001	P	LO2 TANK HELIUM	M			0	50	PIG	1	SLO	27 01243 5	16109	484	3	P	27-11679
	F	1003	P	FUEL TANK HELIUM	O			0	75	PIG	1.5	SLO	27 01243 7	5257	948	3	P	27-11683
	F	5003	P	FUEL TANK HELIUM	M			0	75	PIG	1.5	SLO	27 01243 7	16106	948	3	P	27-11683
	F	5032	P	LN2 PRESSURE	M			0	400	PIG							P	
	F	5033	P	NORM SUP PRESSURE	M			0	4000	PIG							P	
	F	5034	P	EMERG SUP PRESSURE	M			0	4000	PIG							P	
	F	5116	P	DIFFERENTIAL PRESS	M			0	30	PID	.2	SLO					P	
	F	1165	P	S CTL HE BTL DISCH	S			0	3500	PIG	175	SLO	7 01720 5	5655	1213	2	P	27-11650
	F	5165	P	S CTL HE BTL DISCH	M			0	3500	PIG	105	SLO	7 01720 5	6074	1213	2	P	27-11650
	F	1194	P	FACILITY GN2 SUPPLY	S			0	2500	PIG	48	SLO					P	
	F	1246	P	B TANK HE BOTTLES HI	S			0	3500	PIG	105	SLO	7 01720 5	6067	1200	4	P	27-11682
	F	5246	P	B TANK HE BOTTLES HI	M			0	3500	PIG	65	SLO	7 01720 5	6069	1200	4	P	27-11682
B	F	1301	P	GND LOX ULLAGE TANK	S			20	30	PIG	.1	SLO					P	
B	F	1302	P	GND FUEL ULLAGE TANK	S			55	65	PIG	.1	SLO					P	
	F	5247	T	BSTR TANK TEMP	M			M320	M250	DGF	2	SLO	7 01633 58	103L	1221	4	P	27-11682
	I			INERTIAL GUIDANCE														
	I	1515	A	ACCELEROMETER X F1				M12	12	6							P	
	I	1516	A	ACCELEROMETER Y F1				M12	12	6							P	
	I	1517	A	ACCELEROMETER Z F1				M12	12	6							P	
	I	1518	A	ACCELEROMETER X F2				M12	12	6							P	
	I	1519	A	ACCELEROMETER Y F2				M12	12	6							P	
	I	1520	A	ACCELEROMETER Z F2				M12	12	6							P	
	I	1591	C	PITCH GYRO TORQUE				M75	75	MA							P	
	I	1592	C	ROLL GYRO TORQUE				M75	75	MA							P	
	I	1593	C	YAW GYRO TORQUE				M75	75	MA							P	
	I	1594	D	PENDULUM #1 NULL	D	4		M20	20	MIN							P	
	I	1595	D	PENDULUM #2 NULL	D	5		M20	20	MIN							P	
	I	1596	D	OPTIC SIGNAL	D	6		M7.5	7.5	MIN							P	

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MISSILE 16E L/L REPORT NO. AZC-27-059-16 DATE 08 MAR 61 PAGE 3

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	I	1505	H	COMPUTER POSITION X				0	6K	NM		10K					P	
	I	1506	H	COMPUTER POSITION Y				M300	500	NM		10K					P	
	I	1507	H	COMPUTER POSITION Z				0	700	NM		10K					P	
	I	1508	H	RANGE ERROR FUNCTION				0	6K	NM		10K					P	
	I	1509	H	AZM ERROR FUNCTION				M300	500	NM		10K					P	
	I	1502	L	COMPUTER VELOCITY X				0	22K	F/S		10K					P	
	I	1503	L	COMPUTER VELOCITY Y				0	4K	F/S		10K					P	
	I	1504	L	COMPUTER VELOCITY Z				0	6K	F/S		10K					P	
	I	1601	V	400 CPS REFERENCE													P	
	I	1606	V	COMPUTER RESET	O			0	10	VDC	15%						P	
	I	1510	W	ELAPSED TIME				0	450	SEC							P	
	I	1521	X	VERN ENGINE COF SIG				OFF	ON			STP					P	
	I	1522	X	S ENGINE COF SIG				OFF	ON			STP					P	
	I	1570	X	STAGING SIG				OFF	ON			STP					P	
	I	1603	X	WORD GATE FIVE				OFF	ON			STP					P	
	I	1604	X	MULT GATE SIX				OFF	ON			STP					P	
	I	1605	X	112 CPS GATE				OFF	ON			STP					P	
	M			MISCELLANEOUS														
	M	5144	V	STROBELIGHT BATTERY	M												P	
	M	1090	X	MSL ONE INCH MOTION	R			OFF	ON								P	
	M			FACILITIES & GSE														
	M	5362	D	36 INCH WATER VALVE	M												P	
	M	1310	P	SLUG CH LOX DISCH	S			0	500	PIG		SLO					P	

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MISSILE 16E L/L REPORT NO AZC-27-059-16 DATE 08 MAR 61 PAGE 4

	VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CABLE CODE	DRAWING NUMBERS
		M	1995	X	SLG CH LO2 DISCH VLV	R			ON	OFF			STP					P	
		M	1996	X	SLG CH LO2 VENT VLV	R			ON	OFF			STP					P	
		M	1997	X	SLG CH LO2 INLET VLV	R			ON	OFF			STP					P	
		M	1998	X	SLG CH LN2 INLET VLV	R			ON	OFF			STP					P	
		M	1999	X	SLG CH GN2 INLET VLV	R			ON	OFF			STP					P	
B		M	1994	X	SLG CH LO2 LOW LEVEL	R			ON	OFF			STP					P	
A		M	1982	X	LO2 TPNG VLV CLOSED	R			ON	OFF			STP					P	
A		M	1983	X	LO2 TPNG VLV OPEN	R			ON	OFF			STP					P	
A		M	1979	X	PRESS VLV CLOSED	R			ON	OFF			STP					P	
		P			PROPULSION SYSTEM														
		P	5862	B	PUMP LC SPEED	M			0	100	PCT							P	
		P	5605	M	FUEL IN MISSILE	M			0	10K	GAL							F	
C		P	1489	O	S MAA RCC ACCEL	F			M80	80	G	5	2KC					P	
C		P	1482	O	B1 MAA RCC ACCEL	F			M80	80	G	5	2KC					P	
C		P	1488	O	B2 MAA RCC ACCEL	F			M80	80	G	5	2KC					P	
		P	5373	P	LO2 STORAGE TANK	M			0	50	PIG	.6	SLO					P	
		P	5436	P	FUEL STORAGE TANK	M			0	10	PIG		SLO					P	
		P	1474	P	V CTL PRESS REG OUT	S			200	800	PIG	16	SLO	7 01731	3 5618	1208	1	P	27-11651
B		P	1030	T	B1 LOX PUMP INLET	S			M325	M275	DGF	1	SLO	7 01649	9	1182	4	P	27-11721
B		P	1084	T	B2 LOX PUMP INLET	S			M325	M275	DGF	1	SLO	7 01649	9	1189	2	P	27-11722
		P	1329	T	ENG COMP AMBIENT	S			M100	500	DGF	3	SLO	FE/CN		1208	1	P	27-11651
		P	1710	T	AE ENVIRONMENT	S			M100	500	DGF		SLO	CR/CN		1235	3	P	27-17540
		P	1711	T	B1 NACELLE AMBIENT	S			M100	500	DGF		SLO	CR/CN		1204	4	P	27-17546
		P	1712	T	B2 NACELLE AMBIENT	S			M100	500	DGF		SLO	CR/CN		1204	2	P	27-17546
		P	9009	W	LO2 SLUG XFER & FIRE	M												P	

[redacted]

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SECTION 10
8 MARCH 1961

MISSILE INSTRUMENTATION LOG SHEET

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VEHICLE SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
P	1155	X	OBSERVER CUTOFF	R			OFF	ON	VDC		STP					P	
P	1161	X	TCC START SWITCH	R			OFF	ON	VDC		STP					P	
P	1164	X	TCC ENGINE COF SW	R			OFF	ON	VDC		STP					P	
P	1225	X	ENGINE CONTROL READY	R			OFF	ON	VDC		STP					P	
P	1229	X	LO2 HIGH TOPPING	R			OFF	ON	VDC		STP					P	
P	1230	X	LO2 LOW TOPPING	R			OFF	ON	VDC		STP					P	
P	1231	X	LO2 100% SLUG COM	R			OFF	ON	VDC		STP					P	
P	1347	X	S CUTOFF RELAY	R			OFF	ON	VDC		STP					P	
P	1544	X	VERNIER CONTROL	R			OFF	ON	VDC		STP					P	
P	1545	X	S IGN STAGE CONTROL	R			OFF	ON	VDC		STP					P	
P	1546	X	B2 CUTOFF RELAY	R			OFF	ON	VDC		STP					P	
P	1547	X	B1 CUTOFF RELAY	R			OFF	ON	VDC		STP					P	
P	1348	X	COMPLETE COF RELAY	R			OFF	ON	VDC		STP					P	
P	1549	X	IGNITION START	R			OFF	ON	VDC		STP					P	
S			AUTOPILOT SYSTEM														
S	5358	D	ROLL PROGRAM READOUT	M												P	
S	1048	V	PROGRAMMER PITCH SIG	D			0	2.7	VAC	.2	SLO					P	
S	1107	V	B1 PCH ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	
S	1108	V	B2 PCH ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	
S	1113	V	V1 YAW ACTR FEEDBACK	D			M5	7	VAC	5%	30					P	
S	1114	V	V2 YAW ACTR FEEDBACK	D			M5	7	VAC	5%	30					P	
S	1118	V	V2 PCH ACTR FEEDBACK	D			M11	11	VAC	5%	30					P	
S	1119	V	V1 PCH [illegible]TR FEEDBACK	D			M11	11	VAC	5%	30					P	
S	1121	V	GYRO TEST SIG	D			M5	5	VAC	.1	STP					P	
S	1122	V	SERVO [illegible] SIGNAL	D			M11	11	VAC	5%	30					P	
S	1128	V	B1 YAW ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	
S	1129	V	B2 YAW ACTR FEEDBACK	D			M12	12	VAC	5%	30					P	
S	1147	V	PITCH GYRO AMP OUT	D			M10	10	VAC	1	30					P	
S	1149	V	YAW GYRO AMP OUT	D			M10	10	VAC	1	30					P	

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 16E L/C   AZC-27-059-16   08 MAR 61

SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	RANGE LOW	RANGE HIGH	UNITS FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY	TYPE TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE
S	1169	V	ROLL GYRO AMP OUT	O			M10	10	VAC	1	30					P
S	1216	V	S PCH ACTR FEEDBACK	O			M10	10	VAC	5%	30					P
S	1217	V	S YAW ACTR FEEDBACK	O			M10	10	VAC	5%	30					P
S	5270	V	FINE HEATER-PITCH	M			0	150	VAC							P
S	5271	V	FINE HEATER-YAW	M			0	150	VAC							P
S	5272	V	FINE HEATER-ROLL	M			0	150	VAC							
S	5176	W	PROGRAM RUN TIME	M			0	999	SEC							P
S	5702	W	DECADE EVENT TIMER	M			0	10K	SEC							P
S	1235	X	PROGRAMMER RUN TIME	R			OFF	ON	VDC		STP					P
S	1370		STAGING	R			OFF	ON	VDC		STP					P
S	1371	X	BOOSTER JETTISON	R			OFF	ON	VDC		STP					P
S	1372	X	PRESSURIZE VERN TANK	R			OFF	ON	VDC		STP					P
S	1373	X	BOOSTER CUTOFF	R			OFF	ON	VDC		STP					P
S	1374	X	SUSTAINER CUTOFF	R			OFF	ON	VDC		STP					P
S	1375	X	V3F S BACK-UP SIGNAL	R			OFF	ON	VDC		STP					P
S	1376	X	VERNIER CUTOFF	R			OFF	ON	VDC		ATP					P
S	1377	X	EJECT RV UMBILICAL	R			OFF	ON	VDC		STP					P
S	1378	X	RV JETTISON	R			OFF	ON	VDC		STP					P
S	1379	X	FIRE RETRO ROCKETS	R			OFF	ON	VDC		STP					P
T			TELEMETERING SYSTEM													
T	5160	V	TLM #1 BAT DC	M												P
T	5161	V	TLM #1 EXTERNAL DC	M												P
T	5164	V	TLM #2 BAT DC	M												P
T	5165	V	TLM #2 EXTERNAL DC	M												P
T	5166	V	TLM #3 BAT DC	M												P
T	5167	V	TLM #3 EXTERNAL DC	M												P
T	5156	V	TLM 1 FIL INT DC	M												P
T	5157	V	TLM 1 FIL EXT DC	M												P
T	5158	V	TLM 2 FIL INT DC	M												P

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CONVAIR-ASTRONAUTICS

REPORT NO AZC-2

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8 MA

MISSILE INSTRUMENTATION LOG SHEET

16E ?/L AZC-27-059-16 08 MAR 61 7

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS	ACCURACY	RATE FREQUENCY	TYPE OF TRANSDUCER	SERIAL NO	LOCATION NO	QUANTITY	CARD CODE
	T	5159	V	TLM 2 FIL EXT DC		M											P
	T	5160	V	TLM 2 FIL INT DC		M											P
	T	5161	V	TLM 3 FIL EXT DC		M											P
	T	5150	W	TLM #1 TOTAL		M		0	1000	HR							P
	T	5151	W	TLM #2 TOTAL		M		0	1000	HR							P
	T	5152	W	TLM #3 TOTAL		M		0	1000	HR							P
	T	5153	W	TLM #1 BAT TIMER		M											P
	T	5154	W	TLM #2 BAT TIMER		M											P
	T	5155	W	TLM #1 BATTERY		M		0	60	MIN							P
	U			PROPELLANT UTILIZ													
	U	1091	V	ERROR RATIO DEMOD OP		S		M20	20	VDC	±5	20					P
	U	1200	X	LO2 100% SLUG COF-1		R		OFF	ON	VDC		STP					P
	U	1201	X	LO2 TOPG HI CTL-1		R		OFF	ON	VDC		STP					P
	U	1202	X	LO2 TOPG LO CTL-1		R		OFF	ON	VDC		STP					P
	U	1203	X	LO2 95% RAPID LOAD-1		R		OFF	ON	VDC		STP					P
	U	1204	X	FUEL 100% SEC CTL		R		OFF	ON	VDC		STP					P
	U	1205	X	FUEL 100% PRI CTL		R		OFF	ON	VDC		STP					P
	U	1206	X	FUEL 95% SEC CTL		R		OFF	ON	VDC		STP					P
	U	1207	X	FUEL 95% PRI CTL		R		OFF	ON	VDC		STP					P
	U	1208	X	LO2 100% SLUG COF-2		R		OFF	ON	VDC		STP					P
	U	1209	X	LO2 TOPG HI CTL-2		R		OFF	ON	VDC		STP					P
	U	1210	X	LO2 TOPG LO CTL-2		R		OFF	ON	VDC		STP					P
	U	1211	X	LO2 95% RAPID LOAD-2		R		OFF	ON	VDC		STP					P

CONFIDENTIAL

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DATE 22 August 1960
NO. OF PAGES 38

CONVAIR (ASTRONAUTICS) DIVISION
GENERAL DYNAMICS CORPORATION

WS-107A-1

INSTRUMENTATION CONFIGURATION

SERIES E ARTICLE 17

AMR

PREPARED BY TEST PLANNING

CO-ORDINATED BY W. S. Becker
W. S. Becker

APPROVED BY H. R. Macdonald
H. R. Macdonald
Test Planning

CHECKED BY
for T. M. Wooster
Instrumentation

APPROVED BY
P. J. Lynch
Chief - Field Test Engineering

GD

[redacted]

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PAGE NO. A

CONVAIR ASTRONAUTICS

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
A	14 Mar '61	WSB	ADDITIONS:	ALL TABS
			A933T, A934T, A935T, F1309D, F1301P,	
			F1302P, H130P, H185P, H191P, H212P,	
			H224P, H1360P, H1187X, H1188X, I1606V,	
			P14520, P14530, P1020T, P1054T.	
			REASONS FOR REVISION "A" CHANGES	4-1
A	14 Mar '61	WSB	DELETIONS:	ALL TABS
			I1603X, I1604X, I1605X, N1314T, P1010P,	
			P1011P, P1232P, P1465P, P1709T, P1713T,	
			P1714T, P1226X, P1227X, P1228X, P1785X,	
			S1049V, Z2E.	
			LB JV PVM HRM [illegible]	

FORM NO. A-701-1

FOREWORD

This report has been published in accordance with contractual requirements as cited in Convair-Astronautics Report AM-7-289. It describes the instrumentation released for Missile 17-E as of 14 March 1961. A

Information presented here will be used by Air Force, Associate Contractors, Design, Operation and Field Test Groups. Measurement modification will either originate in the Instrumentation Section of the Test Planning Group or will be submitted as a recommendation to this group.

TABLE OF CONTENTS

SUMMARY

The instrumentation configuration for this missile has been estiablished through a study of program test objectives, systems analysis, and operating considerations. A discussion of missile instrumentation and associated characteristics has been summarized in Report AZC-27-059. For a detailed description of the various missile systems, test objectives, and general test program, see Report AE60-0438.

The specific measurements to be transmitted via telemeter have been tabulated and are listed in Sections 8 and 9 in terms of instrumentation systems and telemeter channel assignments.

In addition to the telemetry, the landline instrumentation program for this missile has been included in this report in the form of a master tabulation of landline measurement characteristics, (Section 10).

To clarify specific measurements, instrumentation location schematics have been included in Report AZC-27-059, Section 7.

There are a total of 175 telemetered measurements on 41 channels in this missile divided as follows:

	ACCEL	DEFL	POS	PRES	TEMP	VOLT	DIS POS	MISC	TOTAL
A/FRAME					32				32
PNEU				4	2				6
GUID						2		2	4
HYD				7					7
INER GUID	6	4	5	1	5	11	8	5	45
PROP		2		20	5		3	3	33
A/P SYS		13					1	3	17
MISC	1	1		2	2	7	14	4	31
TOTAL	7	20	5	34	46	20	26	17	175

There are also 167 measurements recorded and displayed via 167 landline channels.

REASONS FOR REVISION "A" CHANGES

I. Data obtained from the following temperature measurements will reveal total heating rates, relative heating intensity of a hot spot between the engines, the relative heating intensities of the outer and inner heat shield peripheries, and model scaling laws applicable to recirculation predictions.

MEAS NO.	DESCRIPTION
ADD	
A933T	AEDC AFT SHIELD CALOR
A934T	AEDC AFT SHIELD CALOR
A935T	AEDC AFT SHIELD CALOR

II. Computer Reset I1606V. demonstrates the start of computer cycling; it is a convenient initial operating time reference to be used with measurement I1510W, ELAPSED TIME.

III. The booster engine LOX pump inlet temperatures (P1020T, P1054T) will be monitored by the regular landline instrumentation system during the launch countdown. This information will assure that turbopump starting NPSH requirements are satisfied and determine the adequacy of the LOX topping and slug systems.

IV. To provide higher quality data during the critical portions of launch, and supply booster engine rough combustion data for the first 15 feet of missile travel, two (2) accelerometer measurements will be monitored via trailing wire umbilical.

MEAS NO.	DESCRIPTION
ADD	
P1452O	B1 NAA RCC ACCEL
P1453O	B2 NAA RCC ACCEL

V. To provide sufficient data to analyze the performance of the airborne hydraulic system, the following instrumentation has been added:

MEAS NO.	DESCRIPTION	CHANNEL
ADD		
H130P	S HYD PUMP DISCH	1.13.1
H185P	S HYD PUMP INLET	1.12.9
H191P	S HI PP TO MANIFOLD	1.12.31
H212P	VERNIER RETURN	2.11.51
H224P	B HYD SYS LO PRESS	2.11.53
H1360P	HPU SUSTAINER RETURN	
H1187X	BSTR OIL EVACUATION	
H1188X	SUST OIL EVACUATION	

VI. Due to the complexity in making and calibrating measurement Z2E, KLYSTROM PW OUTPUT, it has been deleted.

VII. The roll program is accomplished by ARMA signal, which function is monitored by measurement I529W. Therefore measurement S1649X, PROGRAMMER ROLL SIGNAL has been deleted.

VIII. Because there is no further test data needed on LOX slug transfer units at AMR, measurement N1314T, SLUG CHG LO_2 DISC has been deleted.

IX. ARMA reevaluation indicates that these measurements will not provide the data originally required. Therefore they are deleted.

DELETE	
I1603X	WORD GATE FIVE
I1604X	MULT GATE SIX
I1605X	112 CPS GATE

X. These measurements, applicable only on FRF missiles, have been deleted on 17-E.

MEAS NO.	DESCRIPTION
DELETE	
P1010P	B1 LUBE OIL INJ MAN
P1011P	B2 LUBE OIL INJ MAN
P1232P	S LO_2 SEAL CAVITY
P1465P	S LO PR LUBE OIL MAN
P1227X	LOX DOME PURGE
P1228X	IGNITER FUEL PURGE
P1785X	B SECONDARY SHUTDOWN
P1226X	PNEUMATICS CUTOFF
P1709T	SGG COMBUSTOR
P1713T	B1 GAS GEN CUTOFF
P1714T	B2 GAS GEN CUTOFF

SECTION 8

MISSILE INSTRUMENTATION BY SYSTEM

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by system.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

UNITS OF FUNCTION

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

A	F	1	P	LO_2 TANK HELIUM	1	11	35	0	45	PIA	SLO	7 01723	11		480	2		P	27-11608
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA	SLO	7 01723	13		925	Y		P	27-11609
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA	SLO	7 01731	3		1243	4		P	27-16500
A	F	260	P	B TANK HE BOTTLES LO	1	11	17	15	415	PIA	SLO	7 01727	1		1238	1		P	27-11600
A	F	261	P	S TANK HE BOTTLE LO	1	11	21	15	415	PIA	SLO	7 01727	1		1223	2		P	27-16505

MEASUREMENT NUMBER

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number assignment for the applicable measurement.

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
	A			AIRFRAME														
	A	409	T	BLACK CALOR QUAD II	3	10	5	0	1000	DGF	4%	SLO	27 11912	5	1269	1	P	27-11843
	A	412	T	BLACK CALOR QUAD IV	3	10	7	0	1000	DGF	4%	SLO	27 19912	5	1269	4	P	27-11843
	A	438	T	38 GM CALOR QUAD IV	3	10	9	0	1000	DGF	4%	SLO	27 19912	3	1269	4	P	27-11843
	A	439	T	38 GM CALOR QUAD I	3	10	11	0	1000	DGF	4%	SLO	27 19912	3	1269	1	P	27-11843
	A	440	T	19 GM CALOR QUAD IV	3	10	13	0	1000	DGF	4%	SLO	27 19912	1	1269	4	P	27-11843
	A	443	T	19 GM CALOR QUAD I	3	10	3	0	1000	DGF	4%	SLO	27 19912	1	1269	1	P	27-11843
	A	458	T	AIG POD AMBIENT SKIN	3	11	49	500	1500	DGR	40	SLO	CR/CN		1038	3	P	27-11846
	A	464	T	THST STRUCTURE OTBD	3	10	1	0	1000	DGF	4%	SLO	CR/CN		1170	4	P	27-11843
	A	467	T	B2 HAT SECTION INBRD	3	10	37	0	1000	DGF	4%	SLO	CR/CN		1281	2	P	27-11843
	A	470	T	B2 HAT SECTION OTBRD	3	10	17	0	1000	DGF	4%	SLO	CR/CN		1281	2	P	27-11843
	A	473	T	HEAT SHIELD OUTER	3	10	15	0	1000	DGF	4%	SLO	CR/CN		1269	3	P	27-11843
	A	476	T	HEAT SHIELD INNER	3	10	39	0	500	DGF	4%	SLO	CR/CN		1269	3	P	27-11843
	[illegible]	638	T	AFT SIDE A FRAME 52	1	11	13	M100	300	DGF		SLO	27 01287	3 24671	1220	2	P	27-11793
	A	682	T	#1 AIG POD INSUL OUT	3	11	11	500	1500	DGR	40	SLO	CR/CN		1012	2	P	27-11846
	A	683	T	#1 AIG POD INSUL IN	3	11	13	500	1500	DGR	40	SLO	CR/CN		1012	2	P	27-11846
	A	684	T	#2 AIG POD INSUL OUT	3	11	15	500	1500	DGR	40	SLO	CR/CN		1051	2	P	27-11846
	A	685	T	#2 AIG POD INSUL IN	3	11	17	500	1500	DGR	40	SLO	CR/CN		1051	2	P	27-11846
	A	686	T	#3 AIG POD INSUL OUT	3	11	19	500	1500	DGR	40	SLO	CR/CN		1068	2	P	27-11846
	A	687	T	#3 AIG POD INSUL IN	3	11	21	500	1500	DGR	40	SLO	CR/CN		1068	2	P	27-11846
	A	688	T	#4 AIG POD INSUL OUT	3	11	23	500	1500	DGR	40	SLO	CR/CN		1086	3	P	27-11846
	A	689	T	#4 AIG POD INSUL IN	3	11	43	500	1500	DGR	40	SLO	CR/CN		1086	3	P	27-11846
	A	690	T	#5 AIG POD INSUL OUT	3	11	45	500	1500	DGR	40	SLO	CR/CN		1099	2	P	27-11846
	A	691	T	#5 AIG POD INSUL IN	3	11	47	500	1500	DGR	40	SLO	CR/CN		1099	2	P	27-11846
	A	692	T	#1 NACELLE INSUL FWD	3	10	19	500	1500	DGR	40	SLO	CR/CN		1143	4	P	27-11843
	A	693	T	#2 NACELLE INSUL FWD	3	[illegible]	21	500	1500	DGR	[illegible]	SLO	CR/CN		1143	3	P	27-11843
	A	694	T	#1 NACELLE INSUL CTR	3	[illegible]	[illegible]	500	1500	DGR	40	SLO	CR/CN		1176	4	P	27-11843
	A	695	T	#2 NACELLE INSUL CTR	3	[illegible]	[illegible]	500	1500	DGR	40	SLO	CR/CN		[illegible]	[illegible]	P	27-11843
	A	696	T	#1 NACELLE INSUL AFT	3	10	33	500	1500	DGR	40	SLO	CR/CN		1213	4	P	27-11843
	A	697	T	#2 NACELLE INSUL AFT	3	[illegible]	35	500	1500	DGR	40	SLO	CR/CN		1213	2	P	27-11843
	A	933	T	AEDC AFT SHLD CALOR	3	10	41	0	1000	DGF	4%	SLO	FE CN		1455	3	P	27-11923
	A	934	T	AEDC AFT SHLD CALOR	3	10	43	0	1000	DGF	4%	SLO	FE CN		1455	4	P	27-11923

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	OF ADJUST	CARD CODE	DRAWING NUMBERS
	A	935	T	AEDC AFT SHLD CALOR	3	40	45	0	1300	DGF	4	SLO	FE/CN		1268	4	P	27-11943
	D			RANGE SAFETY SYSTEM														
	D	1	V	RSC CUTOFF OUTPUT	1	43	7	0	31	VDC	3	STP					E	
	D	1	V	RSC CUTOFF OUTPUT	1	6	5	0	31	VDC	3	BLP					P	
	D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	4006	UV	5*	SLO		86			P	
	D	3	X	RSC DESTRUCT OUTPUT	2	E	9S	0	30	VDC		STP						
	E			ELECTRICAL POWER SYS														
	E	50	Q	400 CYCLE AC PWRSUP	1	1		370	430	CPS	4	SLO		11			P	
	E	28	V	MSL SYSTEMS INPUT	1	43	11	0	30	VDC	1.0	SLO					P	
	E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC	1.0	SLO		11			P	
	E	53	V	400 CYCLE AC PHASE [illegible]	[illegible]	43	23	105	125	VAC	1.0	SLO		11			P	
	F			PNEUMATIC SYSTEM														
	F	[illegible]	P	FUEL TANK HELIUM [illegible]	[illegible]			[illegible]		PIA	[illegible]	[illegible]	[illegible]		[illegible]		P	[illegible]
	F	3	P	FUEL TANK HELIUM [illegible]	[illegible]			[illegible]		PIA	[illegible]	[illegible]	[illegible]		[illegible]		P	[illegible]
	F	145	[illegible]	[illegible]	[illegible]			[illegible]		[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		P	[illegible]
	F	246	P	[illegible] TANK [illegible]	[illegible]			[illegible]		PIA	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]
	F	115	T	[illegible]	[illegible]			[illegible]					[illegible]		[illegible]		P	[illegible]
	F	[illegible]	T	[illegible] TANK [illegible]	[illegible]			[illegible]					[illegible]		[illegible]		P	[illegible]
	G			[illegible]														
	G	[illegible]	E	[illegible]	[illegible]			[illegible]										
	G	562	E	[illegible]	[illegible]			[illegible]										

[illegible] [redacted]

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MISSILE INSTRUMENTATION LOG SHEET

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUBCARRIER NO.	COMMUTATOR SEG. NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS	ACCURACY	RESPONSE FREQUENCY	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT

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Vehicle	System	Measurement Number	Type Meas.	Description	Telemetry No.	Subcarrier	Commutator Pin No.	Range Low	Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Qual.	Card Code	Drawing Numbers
	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	
	I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
	I	502	L	COMPUTER VELOCITY X	1	E	A	0	32K	F/S		10K					P	
	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
	I	572	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
	I	531	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	
	I	532	T	GYRO 2	1	12	3	M6.3	6.3	DGC		SLO					P	
	I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
	I	534	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
	I	535	T	COMPUTER	1	12	19	0	[illegible]	DGC		SLO					P	
	I	528	V	YAW STEERING SIG	2	5		[illegible]	[illegible]	VAC		[illegible]					P	
	I	528	V	YAW STEERING SIG	2	11	19	M5	5	VAC		10					M	
	I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		5					P	
	I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		5					M	
	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10						
	I	540	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		SLO					P	
	I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
	I	543	V	COMPUTER M50 PSUP	3	9		M55	0	VDC		SLO					P	
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
	I	545	V	COMPUTER [illegible] PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
	I	547	V	COMPUTER 4 PSUP	1	13	43	0	6	VDC		SLO					P	
	I	548	V	COMPUTER 36 PSUP	1	12	41	0	42	VDC		SLO					P	A
	I	560	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40						
	I	560	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
	I	510	W	ELAPSED TIME	1	E	D	0	500	SEC		10K					P	

THIS MATERIAL CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, U.S.C. SECTIONS 793 AND 794, THE TRANSMISSION OR REVELATION OF WHICH IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 17E   REPORT NO AZC-27-059-17   DATE 14 MAR 61   PAGE 5

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	CAPS Code	Drawing Number
	I	561	W	TIME T	2	6	S					BLP					P	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	521	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP					P	
	I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	522	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP					P	
	I	523	X	56V COF RELAYS	2	15	S	OFF	ON			BLP					P	
	I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
	I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
	I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
	I	557	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
	I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	M			MISCELLANEOUS														
A	M	79	A	MSL AXIAL ACCEL FINE	3	5		M.5	0.5	G	.05	20	87 93900 003	2954F	10[illegible]	4	P	27-11762
	[illegible]	143	U	BOOSTER SEPARATION	3	7		0	6	IN	.25	14	7 01676	1 0128	1131	1	P	27-11723
	M	76	X	STROBE LIGHT OCCUR	1	C	95	OFF	ON	VDC		STP					P	
	P			PROPULSION SYSTEM														
	P	83	S	O2 PUMP SPEED	1	2		5660	6400	RPM	60	SLO	27 01267	1 56N	1198	2	P	27-11722
	P	84	S	O1 PUMP SPEED	2	2		5650	6400	RPM	60	SLO	01267	1 7	1198	4	P	27-11721
	P	549	S	S PUMP SPEED	1	3		9.4	11.2	KPM	.1	SLO	27 01264	3 15N	1234	3	P	27-11720
	P	520	U	S MAIN FUEL VALVE	1	3	45	0	90	DEG	2	SLO	NAA				P	
	P	529	U	S MAIN LO2 VLV	1	12	37	0	90	DEG	2	SLO	NAA		1205	3	P	
	P	5	P	S THRUST CHAMB	2	E	1	0	1000	PIA	15	150	7 01731	5 4[illegible]	12[illegible]	1	P	27-117[illegible]
	P	22	P	VERNIER FUEL TANK	1	13	47	[illegible]	1000	PIA	40	SLO	[illegible] 017[illegible]0	5 3569	1206	1	P	27-116[illegible]
	P	26	P	V1 THRUST CHAMBER	1	A	33	[illegible]	400	PIA	15	SLO	[illegible] 01737	5 15[illegible]	1127	4	P	27-11699

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemetry No	Sub-Carrier No	Commutator Pin No	Range Low	Range High	Units of Direction	Accuracy	Rate of Change or Freq. of Fun	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA	10	SLO	7 01737 3	15505	1127	2	P	27-11699
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA	40	SLO	7 01720 3	2710	1208	1	P	27-11651
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA	40	15	7 01731 5	74926	1144	3	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	PIA	40	15	7 01731 5	6012	1173	1	P	27-11721
	P	56	P	S LO2 PUMP INLET	1	13	17	0	150	PIA	5.0	SLO	27 01243 9	15701	1235	1	P	27-11720
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	600	PIA	16	15	7 01731 3	6149	1244	2	P	27-11604
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	600	PIA	16	12	7 01731 3	7591	1244	1	P	27-11604
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA	15	SLO	7 01731 5	74486	1244	1	P	27-11684
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA	15	SLO	7 01731 5	65656	1244	2	P	27-11604
A	P	155	P	B1 GAS GEN COMBUSTOR	1	12	23	0	1000	PIA	25	SLO	7 01731 5	6015	1173	1	P	27-11721
A	P	184	P	B2 GAS GEN COMBUSTOR	1	12	33		1000	PIA	25	SLO	7 01731 5	65746	1144	3	P	27-11722
A	P	279	P	B2 LO PR LUB OIL MAN	2	11	43	0	125	PIA	5	SLO	27 01243 9	772K	1144	3	P	27-11722
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA	38	15	7 01731 7	50446	1235	1	P	27-11720
	P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA	25	SLO	7 01731 5	6475	1235	1	P	27-11720
A	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA	38	SLO	7 01731 7	7306	1235	1	P	27-11720
A	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA	15	SLO	7 01731 5	5574	1235	1	P	27-11720
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIG	5	SLO	27 01243 9	00079	1173	1	P	27-11721
	P	536	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	K61	1197	3	P	27-11720
A	P	671	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	27 01267 3	324A	1222	4	P	27-11793
	P	709	T	SGG COMBUSTOR		11	9	0	1500	DGF		SLO	27 01247 3	96L	1234	4	P	27-11720
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247 3	159L	1210	1	P	27-11721
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247	26[illegible]	1210	3	P	27-11722
	P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	P	547	X	B1 CUTOFF RELAY	1	7	5	0	28	VDC		STP					P	
	P	546	X	COMPLETE [illegible] RELAY	1	13	5	0	28	VDC		STP					P	
	S			AUTOPILOT SYSTEM														
	S	61	D	ROLL DISPL GYRO SIG	1	A	[illegible]	M3	3	DEG	[illegible]	D		42			P	
	S	62	D	PITCH DISPL GYRO SIG	1	A	[illegible]	M3	3	DEG	[illegible]	D		42			P	
	S	63	D	YAW DISPL GYRO SIG	1	A	[illegible]	M3	3	DEG	[illegible]	D		42			P	

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VEHICLE (1)	SYSTEM (2)	MEASUREMENT NUMBER (3)	TYPE MEASUREMENT (4)	DESCRIPTION (5)	TELEMETER NO (6)	SUB-CARRIER NO (7)	COMMUTATOR PIN NO (8)	MEASUREMENT RANGE LOW (9)	MEASUREMENT RANGE HIGH (9)	UNITS OF FUNCTION (10)	ACCURACY (11)	RATE OF CHANGE OR FREQUENCY OF FUNCTION (12)	TYPE OF TRANSDUCER (13)	SERIAL NO (14)	STATION NO (15)	QUADRANT (16)	CARD CODE (17)	DRAWING NUMBERS
3	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	73	
	S	203		B1 PITCH ROLL	1	7		M5	5	DEG	.5	10	7 01660 7	891	1212	1	P	
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG	.5	30	7 01660 7	891	1212	1	M	27-11721
	S	204	D	B2 PITCH ROLL	2	[illegible]	15	M5	5	DEG	.5	10	7 01660 7	870	1212	2	P	27-11722
	S	205	D	B1 YAW	1	5		M5	5	DEG	.5	10	7 01660 7	739	1212	4	P	
	S	205	D	B1 YAW	2	11	5	M5	5	DEG	.5	30	7 01660 7	739	1212	4	M	27-11721
	S	206	D	B2 YAW	2	E	19	M5	5	DEG	.5	10	7 01660 7	902	1212	2	P	27-11722
	S	222	D	V1 PITCH	2	E	7	0	90	DEG	3	10	7 01414 1	10873	1123	4	P	27-11699
	S	223	D	V2 PITCH	2	E	5	0	90	DEG	3	10	7 01414 1	10866	1123	2	P	27-11699
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG	7	10	27 01205 1	297H	1129	4	P	27-11699
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG	7	10	27 01205 1	290H	1129	2	P	27-11699
	S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG	.3	6	7 01600 9	770	1210	1	P	
	S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG	.3	30	7 01600 9	770	1210	1	M	27-11720
	S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG	.3	6	7 01600 9	11798	1210	2	P	
	S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG	.3	30	7 01600 9	11798	1210	2	M	27-11720
	S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S	.3	15		42			P	
	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S	.3	15		42			M	
	S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S	.3	15		42			P	
	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S	.3	15		42			M	
	S	54	R	YAW RATE GYRO SIG	1	8		M6	6	D/S	.3	15		42			P	
	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S	.3	15		42			M	
	S	248	Y	A/P PG SWITCH 17	1	1[illegible]	2	OFF	ON	VDC		STP					P	
	T			TELEMETERING SYSTEM														
	T	4	T	[illegible] T C REF JUNCT	1	11	23	0	200	DGF	8	SEC	27 01267 1	415A	1055	2	P	27-11846
	T	10[illegible]	T	SUSTAINER T/C REF	1	1[illegible]	19	0	200	DGF	8	SEC	27 01267 1	274A	1156	4	P	27-11843
	[illegible]			PROPELLANT UTILIZ[illegible]														
	[illegible]	[illegible]	P	[illegible] TANK HEA[illegible]	[illegible]	[illegible]	[illegible]	0	5	MIN		SEC	27 01260 1	4720	540	3	P	27-11653
	[illegible]	[illegible]	P	FUEL TANK HEA[illegible]	1	1[illegible]	[illegible]	[illegible]	5	MIN		SEC	27 01260 1	[illegible]	540	3	P	27-11654
	[illegible]	[illegible]	[illegible]	[illegible] RATE [illegible]	[illegible]	[illegible]	7	M[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]			P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	Y			DECOY SYSTEM														
	Y	102	L	EJECTION VELOCITY	2	E	75	ON	OFF								P	
	Y	102	L	EJECTION VELOCITY	3	12	11	ON	OFF								P	
	Y	156	V	BATTERY VOLTAGE	3	12	9	ON	OFF								P	
	Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
	Y	103	X	BAROSWITCH	3	12	1	ON	OFF								P	
	Y	104	X	TIMER START CYCLE	3	12	1	ON	OFF								P	
	Y	105	X	BOOSTER ACCEL CYCLE	3	12	1	ON	OFF								P	
	Y	106	X	SUSTAINER HALF CYCLE	3	12	1	ON	OFF								P	
A	Y	141	X	EJECT SURE SIG	2	E	85	ON	OFF								P	
	Y	141	X	EJECT SURE SIG	3	12	11	ON	OFF								P	
	Y	150	X	FAIRING RELEASE	3	12	3	ON	OFF								P	
	Y	151	X	UNLATCH SIGNAL	3	12	3	ON	OFF								P	
	Y	152	X	MOTOR START SIGNAL	3	12	3	ON	OFF								P	
	Y	153	X	EJECT SIGNAL	3	12	3	ON	OFF								P	
	Y	154	X	TUBE ORIENTATION	3	12	5	ON	OFF								P	
	Y	155	X	TUBE UNLATCH	3	12	7	ON	OFF								P	
	Z			AZUSA SYSTEM														
	Z	3	E	XPONDR RF INPUT/AGC	1	[illegible]	17	-120	0	DBM	5*	3		10035			P	

SECTION 9

MISSILE INSTRUMENTATION BY CHANNEL

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by channel.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

UNITS OF FUNCTION

A	P	29	P	V2 THRUST CHAMBER	1	11	5	0	400	PIA		SLO	7 01737 1		1128	2		P	27-11614
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA		SLO	7 01731 3		1243	4		P	27-16500
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA		SLO	7 01723 13		925	Y		P	27-11609
A	P	671	T	TH SECT AMB QUAD 4	1	11	11	100	700	DGF		SLO	7 01684 9		1230	4		P	27-11599

MEASUREMENT NUMBER

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number for the applicable measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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VEHICLE SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SER A NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
			COMM. RATE-CONT.	1	[illegible]												
E	50	Q	400 CYCLE AC PWRSUP	1	1		370.	430.	CPS	4.	SLO		11			P	
P	83	B	B2 PUMP SPEED	1	2		2680.	6400.	RPM	63.5		27 01267 1	56N	1198	2	P	27-11722
P	349	B	S PUMP SPEED	1	3		[illegible]	[illegible]	RPM	[illegible]	SLO	27 01264 3	15N	1254	3	P	27-11720
S	256	D	SUST-ENG YAW	1	4		[illegible]	[illegible]	DEG.	.3	6	7 01636	776	1210	1	P	27-11720
S	257	D	SUSTAINER PITCH	1	5		[illegible]	[illegible]	DEG.	.3	6	7 01660 3	1170	1210	2	P	27-11720
S	405	E	B1 YAW	1	6		[illegible]	[illegible]	DEG.	.5	10	7 01680 7	734	1212	4	P	27-11721
[illegible]	1	V	[illegible]	1	8	[illegible]	[illegible]	[illegible]	VDC	[illegible]							
S	2[illegible]	E	B1 PITCH ROLL	1	7		45	5	DEG.	.5	10	7 01680 7	[illegible]	1212	1	P	27-11721
P	347	X	B1 CUTOFF RELAY	1	7			25	VDC		STP					P	
S	54	R	YAW RATE GYRO SIG	1	8		-6	6	D/S	.5	15		42			P	
S	53	R	PITCH RATE GYRO SIG	1	9		-6	6	D/S	.5	15		42			P	
S	52	R	ROLL RATE GYRO	1	10		-6	6	D/S	.5	15		42			P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 2.5 RPS	1	11	0											
					1	11	1											
	G	582	E	MOD III RG RF OUTPUT	1	11	3	0	15	E	.45	SLO					P	
	F	115	T	LO2 PRESS REG INLET	1	11	5	-200	200	DGF		SLO	7 01664	5 50112	1205	4	P	27-11662
	G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA	.05	SLO					P	
	P	535	T	S LO2 PUMP INLET	1	11	9	-400	-270	DGF		SLO	7 01649	11 861	1197	3	P	27-11740
					1	11	11											
	A	636	T	AFT SIDE A FRAME G2	1	11	13	-400	500	DGF		SLO	27 01287	5 24671	1220	4	P	27-11793
					1	11	15											
	G	503	V	MOD III RG AGC	1	11	17		[illegible]	VDC	.45	SLO					P	
A	T	103	T	BOOSTER T/C REF	1	11	19	0	200	DGF	8	SLO	27 01287	1 274A	1180	4	P	27-11845
	G	5[illegible]	V	MOD III RG AGC NO. 1	1	11	21					SLO					P	
A	T	[illegible]4	T	ARMA T/C REF JUNCT	1	11	2[illegible]		200	DGF	8	SLO	27 01287	1 [illegible]	[illegible]	[illegible]	P	27-11646
				100% CALIB	1	11	25											
				0% CALIB	1	11	27											
				[illegible]% CALIB	1	11	29											
					1	11	[illegible]											
	G	582	E	CONNECTED TO [illegible]	1	11	33											
	F	247	T	[illegible]	1	11	[illegible]	[illegible]	[illegible]	DGF		[illegible]	[illegible] 01633	5 [illegible]	[illegible]	4	P	27-11662
	G	504	C	CONNECTED TO [illegible]	1	11	37											
A	P	671	T	[illegible]	1	11	[illegible]	[illegible]	[illegible]	DGF		[illegible]	27 01287	[illegible]	[illegible]	[illegible]	P	27-117[illegible]
					1	11	41											
					1	11	[illegible]											
					1	11	[illegible]											
	G	5[illegible]	V	CONNECTED TO [illegible]	[illegible]													
					[illegible]													
	G	57[illegible]	V	[illegible]	[illegible]													
					[illegible]													
				[illegible] CALIB	[illegible]													
				CONNECTED TO [illegible]	[illegible]													
				CONNECTED TO [illegible]	[illegible]													
				[illegible]	[illegible]													
				CONNECTED [illegible]	[illegible]													

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Funct	% Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Draw No Number
				COMM. RATE S UPS	1	12	[illegible]											
	I	531	T	GYRO 1	1	12	1	-6.3	6.3	DGC		SLO					P	
	I	532	T	GYRO 2	1	12	3	-5.3	6.3	DGC		SLO					P	
	I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
					1	12	7											
	H	185	P	S HYD PUMP INLET	1	12	9	0	400	PIA	5	SLO					P	
	I	54[illegible]	V	CONTROL 115 PHASE [illegible]	1	12	11	0	130	VDC		SLO					F	
	I	534	T	ANALOG SIG CONVERTER	1	12	13	0	200	DGC		SLO					P	
	I	570	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
	F	14[illegible]	P	S CTL HE BTL DISCH	1	12	17		3500	PIA	1.5	SLO	7 01720	5 5862	1211.2		P	27-11690
	I	535	T	COMPUTER	1	12	19	0	50	DGC		SLO					P	
	I	541	V	CONTROL 42[illegible]	1	12	21	0	25	VDC		SLO					P	
	P	155	P	[illegible]	1	12	23	0	1000	PIA	2.5	SLO	[illegible] 131	5 6213	1173.[illegible]		P	27-11721
				[illegible] CALIB	1	12	25											
				[illegible] CALIB	1	12	27											
				[illegible] CALIB	1	12	2[illegible]											
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	PIA	[illegible]	[illegible]					P	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	PIA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		P	27-11[illegible]

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System	Measurement Number	Type Measurement	Description	Telemeter No. / Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Channel	Card Code	Drawing Number
			COMMU RATE 5 RPS	1 13												
H	130	P	S HYD PUMP DISCH	1 13	1	0	3500	PIA							2	
S	268	X	A/P PG SWITCH 17	1 13	3	OFF	ON	VDC		STP					2	
P	568	X	COMPLETE CUP RELAY	1 13	5		28	VDC		STP					2	
D	1	V	R/C CUTOFF OUTPUT	1 13	7		24	VDC		STP					2	
P	367	X	S CUTOFF RELAY	1 13	9		28	VDC		STP					2	
E	28	V	MSL SYSTEMS INPUT	1 13	11		30	VDC		S					2	
P	30	P	VERNIER LO2 TANK	1 13	13	0	1000	PIA			[illegible]				3	[illegible]
P	92	P	B2 LO2 INJ MANIFOLD	1 13	15	0	1000	PIA			[illegible]					[illegible]
P	56	P	S LO2 PUMP INLET	1 13	17		100	PIA			[illegible]					[illegible]
[illegible]			[illegible]	[illegible]												
[illegible]	81	P	FUEL TANK HEAD	[illegible]				PIA			[illegible]					[illegible]
[illegible]	53	V	HYD CYCLE AC PHASE	[illegible]				VA								
			[illegible] CALIB	[illegible]												
			[illegible] CALIB	[illegible]												
			[illegible] CALIB	[illegible]												
[illegible]	[illegible]	P	[illegible] TANK [illegible]	[illegible]												[illegible]
[illegible]	[illegible]	P	[illegible] TANK [illegible]	[illegible]				PIA								[illegible]
[illegible]			[illegible]	[illegible]												
[illegible]			[illegible]	[illegible]				PIA								[illegible]
[illegible]			[illegible]	[illegible]												[illegible]
[illegible]	143		[illegible]	[illegible]												
[illegible]	54		[illegible]	[illegible]												
[illegible]			[illegible]	[illegible]												
[illegible]			[illegible]	[illegible]												
[illegible]			[illegible]	[illegible]												
[illegible]			[illegible]													
[illegible]			[illegible]													

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DESCRIPTION
[illegible]

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No.	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No.	Quadrant	Card Code	Drawing Numbers
				COMM. RATE 178 RPS	1	C	0											
	M	78	X	STROBE LIGHT OCCUR	1	C	95	OFF	ON	VDC		STP					P	

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1 VEHICLE	2 SYSTEM	3 MEASUREMENT NUMBER	4 TYPE MEASUREMENT	5 DESCRIPTION	6 TELEMETER NO	7 SUB-CARRIER NO	8 COMMUTATOR PIN NO	9 MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	10 UNITS OF FUNCTION	11 ACCURACY	12 RATE OF CHANGE OR FREQUENCY OF FUNCTION	13 TYPE OF TRANSDUCER	14 SERIAL NO	15 STATION NO	16 QUADRANT	17 CARD CODE	DRAWING NUMBERS
				DIGITAL CHANNEL	1	E	0											
	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
	I	510	W	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
	I	505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	
	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
	I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	

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Vehicle	S-Item	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No	Quadrant	Card Code	Drawing Numbers
1	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 46	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	73	
				COMM. RATE CONT.	2	0	0											
					2	1												
	P	64	D	SI PUMP SPEED	2	2		5680	6400	RPM	60	SLO	27 01267 1	7	1196	4	P	27-11721
	I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
	I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	
	I	549	D	PITCH SERVO ERROR	2	6		M4.6	4.1	MIN		20					P	
	I	521	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP					P	
	I	552	D	RED [illegible] GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35					P	
	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	A
	I	581	W	TIME T	2	8	S					BLP					P	
	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	[illegible]		100					P	
	I	522	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP					P	
	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
	I	523	X	S&V COF RELAYS	2	10	S	OFF	ON			BLP					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
3	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	73	
				COMM. RATE 2.5 RPS	2	11	0											
	S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG	.3	30	7 01680 9	776	1210	1	M	27-11720
	S	25	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG	.3	30	7 01680 5	11798	1210	2	M	27-11720
	S	205	D	B1 YAW	2	11	5	M5	5	DEG	.5	30	7 01680 7	739	1212	4	M	27-11721
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG	.3	30	7 01680 7	891	1212	1	M	27-11721
	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S	.3	15		42			M	
	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S	.3	15		42			M	
	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S	.3	15		42			M	
	I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6					M	
	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
	I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10					M	
	I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		.20					M	
	I	552	D	REDNDT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
				100% CALIB	2	11	25											
				0% CALIB	2	11	27											
				50% CALIB	2	11	29											
	I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
	I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
	I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100					M	
					2	11	37											
					2	11	39											
					2	11	41											
A	P	279	P	B2 LO PR LUB OIL MAN	2	11	43	0	125	PIA	5	SLO	27 01243 9	772K	1144	3	P	27-11722
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIA	5	SLO	27 01243 9	00379	1173	1	P	27-11721
A	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA	38	SLO	7 01731 7	7305	1235	1	P	27-11720
					2	11	49											
B	H	212	P	VERNIER RETURN	2	11	51	0	200	PIA	5%	SLO					P	
B	H	224	P	B HYD SYS LO PRESS	2	11	53	0	200	PIA	5%	SLO					P	
				SYNC & 100% CALIB	2	11	55											
				CONNECTED TO 2 11 55	2	11	56											
				CONNECTED TO 2 11 56	2	11	57											
				CONNECTED TO 2 11 57	2	11	58											
				CONNECTED TO 2 11 58	2	11	57											

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1 VEHICLE	2 SYSTEM	3 MEASUREMENT NUMBER	4 TYPE MEASUREMENT	5 DESCRIPTION	6 TELEMETER NO	7 SUB-CARRIER NO.	8 COMMUTATOR PIN NO	9 MEASUREMENT RANGE LOW	9 MEASUREMENT RANGE HIGH	10 UNITS OF FUNCTION	11 ACCURACY	12 RATE OF CHANGE OR FREQUENCY OF FUNCTION	13 TYPE OF TRANSDUCER	14 SERIAL NO	15 STATION NO	16 QUADRANT	17 CARD CODE	DRAWING NUMBERS
1	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	72	
				COMM. RATE CONT.	2	A	0											
	I	516	A	ACCELEROMETER YF1	2	A		M12	12	G							P	
	I	519	A	ACCELEROMETER YF2	2	C		M12	12	G							P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Code	Drawing Numb.
				COMM. RATE 30 RPS	2	E	0											
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA	10	150	7 01731 5	4750	1235	1	P	27-11720
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA	30	15	7 01731 7	50440	1235	1	P	27-11720
	S	223	D	V2 PITCH	2	E	5	0	50	DEG	5	10	7 01414 1	10666	1123	2	P	27-11699
	S	222	D	V1 PITCH	2	E	7	0	50	DEG	5	10	7 01414 1	10675	1123	4	P	27-11699
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	800	PIA	10	15	7 01731 5	7091	1244	1	P	27-11664
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	800	PIA	10	15	7 01731 5	6149	1244	2	P	27-11664
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG	7	10	27 01205 1	297M	1125	4	P	27-11699
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG	.5	10	7 01680 7	879	1212	2	P	27-11722
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG	7	10	27 01205 1	550M	1125	2	P	27-11699
	S	206	D	B2 YAW	2	E	19	M5	5	DEG	.5	10	7 01680 7	905	1212	2	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	PIA	40	15	7 01731 5	6012	1175	1	P	27-11721
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA	40	15	7 01731 5	14920	1144	3	P	27-11722
				100% CALIB	2	E	25											
				0% CALIB	2	E	27											
				50% CALIB	2	E	29											
	P	6	P	CONNECTED TO 2 E 1	2	E	31											
	P	330	P	CONNECTED TO 2 E 3	2	E	33											
	S	223	D	CONNECTED TO 2 E 5	2	E	35											
	S	222	D	CONNECTED TO 2 E 7	2	E	37											
	P	60	P	CONNECTED TO 2 E 9	2	E	39											
	P	59	P	CONNECTED TO 2 E 11	2	E	41											
	S	233	D	CONNECTED TO 2 E 13	2	E	43											
	S	204	D	CONNECTED TO 2 E 15	2	E	45											
	S	234	D	CONNECTED TO 2 E 17	2	E	47											
	S	206	D	CONNECTED TO 2 E 19	2	E	49											
	P	39	P	CONNECTED TO 2 E 21	2	E	51											
	P	38	P	CONNECTED TO 2 E 23	2	E	53											
				SYNC & 100% CALIB	2	E	55											
				CONNECTED TO 2 E 55	2	E	56											
				CONNECTED TO 2 E 56	2	E	57											
				CONNECTED TO 2 E 57	2	E	58											
				CONNECTED TO 2 E 58	2	E	59											
	Y	102	L	EJECTION VELOCITY	2	E	75	ON	OFF								P	
	Y	141	X	EJECT SURE SIG	2	E	85	ON	OFF								P	
	[illegible]	3	X	RSC DESTRUCT OUTPUT	2	E	95	0	30	VDC			STP				P	

[redacted]

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MISSILE INSTRUMENTATION LOG SHEET

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
				COMM. RATE CONT.	3	0	0											
					3	1												
					3	2												
					3	3												
					3	4												
A	M	79	A	[illegible]L AXIAL ACCEL FINE	3	5		M.5	0.5	G	.05	20	87 93900 063	2954F	1057	4	P	27-11702
					3	6												
	M	143	D	BOOSTER SEPARATION	3	7		0	8	IN	.25	14	7 01676 1	LU128	1131	1	P	27-11723
					3	8												
	I	543	V	COMPUTER [illegible] PSUP	3	9		155	0	VDC		SLO					P	

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MISSILE INSTRUMENTATION LOG SHEET

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				COMM. RATE 2.5 RPS	3	10	[illegible]											
	A	464	T	THST STRUCTURE OTBD	3	10	1	0	4000	DGF	4%	SLO	CR/CN		1170	4	P	27-11843
	A	443	T	19 GM CALOR QUAD I	3	10	3	0	4000	DGF	4%	SLO	27 19912	1	1267	1	P	27-11843
	A	409	T	BLACK CALOR QUAD II	3	10	5	0	4000	DGF	4%	SLO	27 19912	5	1267	[illegible]	P	27-11843
	A	412	T	BLACK CALOR QUAD IV	3	10	7	0	4000	DGF	4%	SLO	27 19912	5	1267	4	P	27-11843
	A	438	T	38 GM CALOR QUAD I[illegible]	3	10	9	0	4000	DGF	4%	SLO	27 19912	3	1267	4	P	27-11843
	A	439	T	38 GM CALOR QUAD I	3	10	11	0	4000	DGF	4%	SLO	27 19912	3	1267	1	P	27-11843
	A	44[illegible]	T	19 GM CALOR QUAD IV	3	10	13	0	4000	DGF	4%	SLO	27 19912	1	1267	4	P	27-11843
	A	473	T	HEAT SHIELD OUTER	3	10	15	0	4000	DGF	4%	SLO	CR/CN		1267	[illegible]	P	27-11843
	A	47[illegible]	T	02 HAT SECTION OTBRD	3	10	17	0	4000	DGF	4%	SLO	CR/CN		12[illegible]	2	P	27-11843
	A	692	T	01 NACELLE INSUL PAD	3	10	19	500	1500	DGR	40	SLO	CR/CN		1142	4	P	27-11843
	A	693	T	02 NACELLE INSUL PAD	3	10	21	500	1500	DGR	40	SLO	CR/CN		1142	3	P	27-11843
	A	694	T	01 NACELLE INSUL CTR	3	10	23	500	1500	DGR	40	SLO	CR/CN		1196	4	P	27-11843
				100% CALIB	3	10	25											
				0% CALIB	3	10	27											
				0% CALIB	3	10	29											
	A	695	T	02 NACELLE INSUL CTR	3	10	31	500	1500	DGR	40	SLO	CR/CN		1196	3	P	27-11843
	A	696	T	01 NACELLE INSUL AFT	3	10	33	500	1500	DGR	40	SLO	CR/CN		1215	4	P	27-11843
	A	697	T	02 NACELLE INSUL AFT	3	10	35	500	1500	DGR	40	SLO	CR/CN		1215	2	P	27-11843
	A	467	T	02 HAT SECTION [illegible]	3	10	37	[illegible]	[illegible]	DGF	4%	SLO	CR/CN		1281	2	P	27-11843
	A	476	T	HEAT SHIELD [illegible]	3	10	39	[illegible]	[illegible]	DGF	4%	SLO	CR/CN		1267	[illegible]	P	27-11843
	A	433	T	AEDC AFT [illegible]	3	10	41	[illegible]	[illegible]	DGF	[illegible]	SLO	[illegible]		1268	3	P	27-11843
	A	434	T	AEDC AFT [illegible] CALOR	3	10	43	[illegible]	[illegible]	DGF	[illegible]	SLO	[illegible]		1268	4	P	27-11843
	A	435	T	AEDC AFT [illegible] CALOR	3	10	45	[illegible]	4000	DGF	[illegible]	SLO	[illegible]		1268	4	P	27-11843
					3	10	47											
					3	10	49											
					3	10	51											
					3	10	53											
				[illegible] & 100% CALIB	3	10	55											
				CONNECTED TO [illegible]														
				CONNECTED TO [illegible]														
				CONNECTED TO [illegible]														
				CONNECTED TO [illegible]														

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MISSILE INSTRUMENTATION LOG SHEET

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR ACCURACY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CALIB CODE	[illegible]
				COMM. RATE 5 RPS	3	41	[illegible]											
					3	41	[illegible]											
					3	41	3											
	P	713	T	B1 GAS GEN COMBUSTOR	3	41	5	0	1500	DGF		500	27-01247	[illegible]	[illegible]	[illegible]	P	27-[illegible]
	P	714	T	B2 GAS GEN COMBUSTOR	3	41	7	0	1500	DGF		500	27-01247	[illegible]	[illegible]	[illegible]	P	27-[illegible]
	P	709	T	SUS COMBUSTOR	3	41	9	0	1500	DGF		500	27-01247	[illegible]	[illegible]	[illegible]	P	27-[illegible]
	A	682	T	#1 AIG POD INSUL OUT	3	41	11	[illegible]	1500	DGR	40	500	CR/[illegible]		101	[illegible]	P	27-[illegible]
	A	683	T	#1 AIG POD INSUL IN	3	41	13	[illegible]	1500	DGR	40	500	CR/[illegible]		[illegible]		P	27-[illegible]
	A	684	T	#2 AIG POD INSUL OUT	3	41	15	50	1500	DGR	40	500	CR/[illegible]		[illegible]	[illegible]	P	27-[illegible]
	A	685	T	#2 AIG POD INSUL IN	3	41	17	[illegible]	1500	DGR	40	500	CR/[illegible]		[illegible]		P	27-[illegible]
	A	686	T	#3 AIG POD INSUL OUT	3	41	19	[illegible]	1500	DGR	40	500	CR/[illegible]		1060	[illegible]	P	27-[illegible]
	A	687	T	#3 AIG POD INSUL IN	3	41	21	[illegible]	1500	DGR	40	500	CR/[illegible]		1060	[illegible]	P	27-[illegible]
	A	688	T	#4 AIG POD INSUL OUT	3	41	23	[illegible]	1500	DGR	40	500	CR/[illegible]		1060	[illegible]	P	27-[illegible]
				100% CALIB	3	41	25											
				0% CALIB	3	41	27											
				CALIB	3	41	[illegible]											
					3	41	31											
					3	41	33											
					3	41	35											
					3	41	37											
					3	41	39											
					3	41	41											
	A	[illegible]	T	[illegible]	3	41	[illegible]	[illegible]	[illegible]	[illegible]	40	[illegible]	[illegible]		[illegible]		P	[illegible]
	A	69[illegible]	T	#[illegible] AIG POD [illegible]	3	41	[illegible]	[illegible]	1500	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		P	[illegible]
	A	691	T	#3 AIG POD INSUL [illegible]	3	41	47	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		P	[illegible]
	A	[illegible]	T	AIG POD [illegible]	3	41	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]
					3	41	[illegible]											
					3	41	[illegible]											
				SYNC & [illegible] CALIB	3	41	55											
				CONNECTOR [illegible]	3	41	56											
				CONNECTOR [illegible]	3	41	57											
				CONNECTOR [illegible]	3	41	58											
				CONNECTOR [illegible]	3	41	[illegible]											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE
				[illegible]	[illegible]								
Y		[illegible]	A	BAROSWITCH	[illegible]								
Y		104	Y	[illegible]	[illegible]								
Y		105	A	BOOSTER [illegible]	[illegible]								
Y		[illegible]	X	[illegible]	[illegible]								
Y		[illegible]	A	FAIRING [illegible]	[illegible]								
Y		151	A	[illegible] SIGNAL	[illegible]								
Y		[illegible]	A	[illegible] SIGNAL	[illegible]								
Y		[illegible]	[illegible]	[illegible] SIGNAL	[illegible]								
Y		[illegible]	A	TUBE ORIENTATION	[illegible]								
Y		[illegible]	X	TUBE [illegible]	[illegible]								
Y		[illegible]	V	BATTERY VOLTAGE	[illegible]								
Y		[illegible]	[illegible]	[illegible] VELOCITY	[illegible]								
Y		[illegible]	A	EJECT [illegible]	[illegible]								

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Vehicle (1)	System (2)	Measurement Number (3)	Type Measurement (4)	Description (5)	Telemeter No (6)	Sub-Carrier No (7)	Commutator Pin No (8)	Measurement Range Low (9)	Measurement Range High (9)	Units of Function (10)	Accuracy (11)	Rate of Change or Frequency of Function (12)	Type of Transducer (13)	Serial No (14)	Station No (15)	Quadrant (16)	Card Code (17)	Drawing Numbers
3	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	42 46	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70		73	
					3	12	51											
					3	12	53											
					3	12	55											
				CONNECTED TO 3 12 55	3	12	56											
				CONNECTED TO 3 12 56	3	12	57											
				CONNECTED TO 3 12 57	3	12	58											
				CONNECTED TO 3 12 58	3	12	59											
				COMM. RATE CONT.	3	13	0											
	I	517	A	ACCELEROMETER ZF1	3	13		M12	12	G							P	
	I	520	A	ACCELEROMETER ZF2	3	A		M12	12	G							P	
	I	513	A	ACCEL XF1 DIRECT	3	C		M12	12	G							P	
	I	514	A	ACCEL XF2 DIRECT	3	E		M12	12	G							P	

SECTION 10

LANDLINE INSTRUMENTATION

The Lan ne Instrumentation presented in this section contains the latest available characteristics of the individual measurements. In addition the type of recordings indicated.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

UNITS OF FUNCTION

FREQUENCY RESPONSE

Denotes the frequency response requirements in cps of the instrumentation system for the measurement.

TRANSDUCER SERIAL NUMBER

A	F	1125	P	B CTL PNEU REG OUT	S	200	600	PIA	16	SLO	7 01731	3	2841	1243	4	27-16500
A	F	1194	P	FACILITY GN_2 SUPPLY	S	0	2400	PIG	48	SLO						
A	F	1288	P	ST PNEU REG OUT	S	0	800	PIA	10	SLO	7 [illegible]	1		1223	2	27-16505
A	G	1026	V	PITCH ANALOG	D	M30	30	VDC	0.2	SLO						27-0001-3

MEASUREMENT NUMBER

ACCURACY REQUIREMENT

Present in units of the function measured.

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

RECORDER ASSIGNMENT

This code defines the method to be utilized to record the measurement. A double letter here indicates that this measurement will be recorded on two different types of recorders.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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MISSILE INSTRUMENTATION LOG SHEET

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	D			RANGE SAFETY SYSTEM														
	D	5142	V	RSC #1 BAT DC		M											P	
	D	5143	V	RSC #2 BAT DC		M											P	
	D	5140	W	RSC #1 TOTAL TIMER		M		0	1000	HR							P	
	D	5141	W	RSC #2 TOTAL TIMER		M		0	1000	HR							P	
	D	5150	W	RSC #1 & 2 BATTERY		M		0	1000	HR							P	
	E			ELECTRICAL POWER SYS														
	E	1043	C	CRITICAL POWER A				0	800	A	8	4					P	
	E	1044	C	CRITICAL POWER B				0	800	A	8	4					P	
	E	1045	C	CRITICAL POWER C				0	800	A	8	4					P	
	E	5066	C	MISSILE DC AMPS		M		0	200	AMP							P	
	E	5068	C	EMERGENCY GENERATOR		M		0	200	AMP							P	
	E	5005	Q	INVERTER FREQUENCY		M		350	450	CPS							P	
	E	5029	Q	MISSILE EXT PHASE A		M		350	450	CPS							P	
	E	5031	Q	PHASE A EXT @ MSL		M		396	404	CPS							P	
	E	5003	V	BATTERY OUTPUT		M		15	35	VDC							P	
	E	5006	V	INVERTER PHASE A		M		90	140	VAC							P	
	E	5022	[illegible]	MISSILE AC EXT @ MSL		M		110	120	VAC							P	
	E	5023	V	MISSILE EXTERNAL AC		M		110	120	VAC							P	
	E	5030	V	MISSILE DC EXT @ MSL		M		0	40	VDC							P	
	E	5065	V	MISSILE EXTERNAL DC		M		0	40	VDC							P	
	E	5109	W	MAIN MSL BATT TIMER		M											P	
	E	5110	W	INVERTER TIMER		M											P	
	F			PNEUMATIC SYSTEM														
	F	1309	D	GND LOX TK VENT VLV		R		OPEN	CLS			SLO					P	

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MISSILE INSTRUMENTATION LOG SHEET

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1 VEHICLE	2 SYSTEM	3 MEASUREMENT NUMBER	4 TYPE MEASUREMENT	5 DESCRIPTION	6 RECORDER	7 TRACK	8 CHANNEL	9 MEASUREMENT RANGE LOW	9 MEASUREMENT RANGE HIGH	10 UNITS OF FUNCTION	11 ACCURACY	12 RATE OF CHANGE OR FREQUENCY OF FUNCTION	13 TYPE OF TRANSDUCER	14 SERIAL NO.	15 STATION NO.	16 QUADRANT	17 CARD CODE	DRAWING NUMBERS
	F	1001	P	LO2 TANK HELIUM		O		0	50	PIG	1	SLO	27 01243 5		484	3	P	27-11679
	F	5001	P	LO2 TANK HELIUM		M		0	50	PIG	1	SLO	27 01243 5	16096	484	3	P	27-11679
	F	1003	P	FUEL TANK HELIUM		O		0	75	PIG	1.5	SLO	27 01243 7	5236	948	3	P	27-11683
	F	5003	P	FUEL TANK HELIUM		M		0	75	PIG	1.5	SLO	27 01243 7	16089	948	3	P	27-11683
	F	5032	P	LN2 PRESSURE		M		0	400	PIG							P	
	F	5033	P	NORM SUP PRESSURE		M		0	4000	PIG							P	
	F	5034	P	EMERG SUP PRESSURE		M		0	4000	PIG							P	
	F	5116	P	DIFFERENTIAL PRESS		M		0	30	PID	.2	SLO					P	
	F	1145	P	S CTL HE BTL DISCH		S		0	3500	PIG	17[illegible]	SLO	7 01720 5	5873	1213	2	P	27-11650
	F	5145	P	S CTL HE BTL DISCH		M		0	3500	PIG	105	SLO	7 01720 5	5653	1213	2	P	27-11650
	F	1194	P	FACILITY GN2 SUPPLY		S		0	2500	PIG	48	SLO					P	
	F	1246	P	B TANK HE BOTTLES HI		S		0	3500	PIG	105	SLO	7 01720 5	5181	1200	4	P	27-11682
	F	5246	P	B TANK HE BOTTLES HI		M		0	3500	PIG	65	SLO	7 01720 5	60655	1200	4	P	27-11682
	F	1301	P	GND LO2 ULLAGE TANK		S		20	30	PIG	.1	SLO					P	
	F	1302	P	GND FUEL ULLAGE TANK		S		55	65	PIG	.1	SLO					P	
	F	5247	T	BSTR TANK TEMP		M		M320	M250	DGF	2	SLO	7 01633 58	105L	1221	4	P	27-11682
	H			HYDRAULIC SYSTEM														
	H	1360	P	HPU SUSTAINER RETURN		G		0	200	PIA	2%	SLO					P	
	H	1187	X	BSTR OIL EVACUATION		R		ON	OFF	VDC		STP	PEN 74				P	
	H	1188	X	SUS OIL EVACUATION		R		ON	OFF	VDC		STP	PEN 75				P	
	I			INERTIAL GUIDANCE														
	I	1515	A	ACCELEROMETER X F1				M12	12	G							P	
	I	1516	A	ACCELEROMETER Y F1				M12	12	G							P	
	I	1517	A	ACCELEROMETER Z F1				M12	12	G							P	
	I	1518	A	ACCELEROMETER X F2				M12	12	G							P	
	I	1519	A	ACCELEROMETER Y F2				M12	12	G							P	

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MISSILE INSTRUMENTATION LOG SHEET

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VEHICLE (1)	SYSTEM (2)	MEASUREMENT NUMBER (3)	TYPE MEASUREMENT (4)	DESCRIPTION (5)	RECORDER (6)	TRACK (7)	CHANNEL (8)	MEASUREMENT RANGE LOW (9)	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION (10)	ACCURACY (11)	RATE OF CHANGE OR FREQUENCY OF FUNCTION (12)	TYPE OF TRANSDUCER (13)	SERIAL NO (14)	STATION NO. (15)	QUADRANT (16)	CARD CODE (17)	DRAWING NUMBERS
	I	1520	A	ACCELEROMETER Z F2				M12	12	G							P	
	I	1591	C	PITCH GYRO TORQUE				M75	75	MA							P	
	I	1592	C	ROLL GYRO TORQUE				M75	75	MA							P	
	I	1593	C	YAW GYRO TORQUE				M75	75	MA							P	
	I	1594	D	PENDULUM #1 NULL		D	4	M20	20	MIN							P	
	I	1595	D	PENDULUM #2 NULL		D	5	M20	20	MIN							P	
	I	1596	D	OPTIC SIGNAL		D	6	M7.5	7.5	MIN							P	
	I	1505	H	COMPUTER POSITION X				0	6K	NM		10K					P	
	I	1506	H	COMPUTER POSITION Y				M300	500	NM		10K					P	
	I	1507	H	COMPUTER POSITION Z				0	700	NM		10K					P	
	I	1508	H	RANGE ERROR FUNCTION				0	6K	NM		10K					P	
	I	1509	H	AZM ERROR FUNCTION				M300	0500	NM		10K					P	
	I	1502	L	COMPUTER VELOCITY X				0	22K	F/S		10K					P	
	I	1503	L	COMPUTER VELOCITY Y				0	4K	F/S		10K					P	
	I	1504	L	COMPUTER VELOCITY Z				0	6K	F/S		10K					P	
	I	1601	V	400 CPS REFERENCE													P	
	I	1606	V	COMPUTER RESET		0		0	10	VDC	15%						P	
	I	1510	W	ELAPSED TIME													P	
	I	1521	X	VERN ENGINE COF SIG				ON	OFF								P	
	I	1522	X	S ENGINE COF SIG				ON	OFF								P	
	I	1570	X	STAGING SIG				ON	OFF								P	
	M			MISCELLANEOUS														
	M	5144	V	STROBELIGHT BATTERY		M											P	
	M	1090	X	MSL ONE INCH MOTION		P		OFF	ON				PEN 22				P	

THIS MATERIAL CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, U.S.C., SECTIONS 793 AND 794, THE [redacted] OR REVELATION OF WHICH IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

[redacted]

REPORT NO. AZC-27-059-17 [redacted]

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MISSILE INSTRUMENTATION LOG SHEET

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	N			FACILITIES & GSE														
	N	5362	D	36 INCH WATER VALVE		M											P	
	N	1310	P	SLUG CH LO2 DISCH		S		0	500	PIG		SLO					P	
	N	1335	X	SLG CH LO2 DISCH VLV		R		ON	OFF			STP	PEN23 654				P	
	N	1336	X	SLG CH LO2 VENT VLV		R		ON	OFF			STP	PEN24 658				P	
	N	1337	X	SLG CH LO2 INLET VLV		R		ON	OFF			STP	PEN25 657				P	
	N	1338	X	SLG CH LN2 INLET VLV		R		ON	OFF			STP	PEN 26				P	
	N	1339	X	SLG CH GN2 INLET VLV		R		ON	OFF			STP	PEN 27				P	
	P			PROPULSION SYSTEM														
	P	5262	B	PUMP LC SPEED		M		0	100	PCT							P	
	P	5665	M	FUEL IN MISSILE		M		0	K100	GAL							P	
	P	1452	O	B1 NAA RCC ACCEL		F		M80	80	G	5	2KC					P	
	P	1453	O	B2 NAA RCC ACCEL		F		M80	80	G	5	2KC					P	
	P	5373	P	LO2 STORAGE TANK		M		0	50	PIG							P	
	P	5430	P	FUEL STORAGE TANK		M		0	10	PIG		SLO					P	
	P	1474	P	V CTL PRESS REG OUT		S		200	800	PIG	16	SLO	7 01731 3	4996	1208	1	P	27-11651
	P	1020	T	B1 LOX PUMP INLET		S		M325	M275	DGF	1	SLO	7 01649 9		1182	4	P	27-11721
	P	1054	T	B2 LOX PUMP INLET		S		M325	M275	DGF	1	SLO	7 01649 9		1189	2	P	27-11722
	P	1375	T	ENG COMP AMBIENT		S		M100	500	DGF	3	SLO	FE/CN		1208	1	P	27-11651
	P	1710	T	SE ENVIRONMENT		S		M100	500	DGF		SLO	CR/CN		1235	3	P	27-17540
	P	1711	T	B1 NACELLE AMBIENT		S		M100	500	DGF		SLO	CR/CN		1204	4	P	27-17546
	P	1712	T	B2 NACELLE AMBIENT		S		M100	500	DGF		SLO	CR/CN		1204	2	P	27-17546
	P	5849	W	LO2 SLUG XFER & FIRE		M											P	

MISSILE INSTRUMENTATION LOG SHEET

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1 VEHICLE	2 SYSTEM	3 MEASUREMENT NUMBER	4 TYPE MEASUREMENT	5 DESCRIPTION	6 RECORDER	7 TRACK	8 CHANNEL	9 MEASUREMENT RANGE LOW	9 MEASUREMENT RANGE HIGH	10 UNITS OF FUNCTION	11 ACCURACY	12 RATE OF CHANGE OR FREQUENCY OF FUNCTION	13 TYPE OF TRANSDUCER	14 SERIAL NO	15 STATION NO	16 QUADRANT	17 CARD CODE	DRAWING NUMBERS
3	4	5 8	9	10 29	30	31 32	33 34	35 38	39 42	43 45	46 48	49 51	52 53 54 55 56 57 58 59 60 61	62 66	67 70	71	72	
	P	1155	X	OBSERVER CUTOFF		R		OFF	ON	VDC		STP	PEN 16				P	
	P	1161	X	TCC START SWITCH		R		OFF	ON	VDC		STP	PEN 4				P	
	P	1164	X	TCC ENGINE COF SW		R		OFF	ON	VDC		STP	PEN 15				P	
	P	1225	X	ENGINE CONTROL READY		R		OFF	ON	VDC		STP	PEN 32				P	
	P	1229	X	LO2 HIGH TOPPING		R		OFF	ON	VDC		STP	PEN 46				P	
	P	1230	X	LO2 LOW TOPPING		R		OFF	ON	VDC		STP	PEN 47				P	
	P	1231	X	LO2 100% SLUG COM		R		OFF	ON	VDC		STP	PEN 45				P	
	P	1347	X	S CUTOFF RELAY		R		OFF	ON	VDC		STP	PEN 13				P	
	P	1544	X	VERNIER CONTROL		R		OFF	ON	VDC		STP	PEN 7				P	
	P	1545	X	S IGN STAGE CONTROL		R		OFF	ON	VDC		STP	PEN 6				P	
	P	1546	X	B2 CUTOFF RELAY		R		OFF	ON	VDC		STP	PEN 12				P	
	P	1547	X	B1 CUTOFF RELAY		R		OFF	ON	VDC		STP	PEN 11				P	
	P	1548	X	COMPLETE COF RELAY		R		OFF	ON	VDC		STP	PEN 17				P	
	P	1549	X	IGNITION START		R		OFF	ON	VDC		STP	PEN 5				P	
	S			AUTOPILOT SYSTEM														
	S	5358	D	ROLL PROGRAM READOUT		M											P	
	S	1048	V	PROGRAMMER PITCH SIG		D		0	2.7	VAC	.2	SLO					P	
	S	1107	V	B1 PCH ACTR FEEDBAC		D		M12	12	VAC	5%	30					P	
		1108	V	B2 PCH ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1113	V	V1 YAW ACTR FEEDBACK		D		M5	7	VAC	5%	30					P	
	S	1114	V	V2 YAW ACTR FEEDBACK		D		M5	7	VAC	5%	30					P	
	S	1118	V	V2 PCH ACTR FEEDBACK		D		M11	11	VAC	5%	30					P	
	S	1119	V	V1 PCH ACTR FEEDBACK		D		M11	11	VAC	5%	30					P	
	S	1121	V	GYRO TEST SIG		D		M5	5	VAC	.1	STP					P	
	S	1122	V	SERVO TEST SIGNAL		D		M11	11	VAC	5%	30					P	
	S	1128	V	B1 YAW ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1129	V	B2 YAW ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1147	V	PITCH GYRO AMP OUT		D		M10	10	VAC	1	30					P	
	S	1148	V	YAW GYRO AMP OUT		D		M10	10	VAC	1	30					P	

CONVAIR-ASTRONAUTICS

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.		CARD CODE	DRAWING NUMBERS
	S	1216	V	S PCH ACTR FEEDBACK		D		M10	10	VAC	5%	30					P	
	S	1217	V	S YAW ACTR FEEDBACK		D		M10	10	VAC	5%	30					P	
	S	5270	V	FINE HEATER-PITCH		M		0	150	VAC							P	
	S	5271	V	FINE HEATER-YAW		M		0	150	VAC							P	
	S	5272	V	FINE HEATER-ROLL		M		0	150	VAC							P	
	S	5176	W	PROGRAM RUN TIME		M		0	999	SEC							P	
	S	5282	W	DECADE EVENT TIMER		M		0	10K	SEC							P	
	S	1235	X	PROGRAMMER RUN TIME		R		OFF	ON	VDC		STP	PEN 42				P	
	S	1370	X	STAGING		R		OFF	ON	VDC		STP	PEN 43				P	
	S	1371	X	BOOSTER JETTISON		R		OFF	ON	VDC		STP	PEN 44				P	
	S	1372	X	PRESSURIZE VERN TANK		R		OFF	ON	VDC		STP	PEN 3 628				P	
	S	1373	X	BOOSTER CUTOFF		R		OFF	ON	VDC		STP	PEN 29				P	
	S	1374	X	SUSTAINER CUTOFF		R		OFF	ON	VDC		STP	PEN 30				P	
	S	1375	X	VSHPS BACK-UP SIGNAL		R		OFF	ON	VDC		STP	PEN 48				P	
	S	1376	X	VERNIER CUTOFF		R		OFF	ON	VDC		STP	PEN 31				P	
	S	1377	X	EJECT RV UMBILICAL		R		OFF	ON	VDC		STP	PEN 50				P	
	S	1378	X	RV JETTISON		R		OFF	ON	VDC		STP	PEN 51				P	
	S	1379	X	FIRE RETRO ROCKETS		R		OFF	ON	VDC		STP	PEN 52				P	
	T			TELEMETERING SYSTEM														
	T	5140	V	TLM #1 BAT DC		M											P	
	T	5141	V	TLM #1 EXTERNAL DC		M											P	
	T	5144	V	TLM #2 BAT DC		M											P	
	T	5145	V	TLM #2 EXTERNAL DC		M											P	
	T	5146	V	TLM #3 BAT DC		M											P	
	T	5147	V	TLM #3 EXTERNAL DC		M											P	
	T	5156	V	TLM 1 FIL INT DC		M											P	
	T	5157	V	TLK 1 FIL EXT DC		M											P	
	T	5158	V	TLM 2 FIL INT DC		M											P	
	T	5159	V	TLM 2 FIL EXT DC		[illegible]											P	

MISSILE INSTRUMENTATION LOG SHEET

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	T	5160	V	TLM 3 FIL INT DC		M											P	
	T	5161	V	TLM 3 FIL EXT DC		M											P	
	T	5150	W	TLM #1 TOTAL		M		0	1000	HR							P	
	T	5151	W	TLM #2 TOTAL		M		0	1000	HR							P	
	T	5152	W	TLM #3 TOTAL		M		0	1000	HR							P	
	T	5153	W	TLM #1 BAT TIMER		M											P	
	T	5154	W	TLM #2 BAT TIMER		M											P	
	T	5155	W	TLM #1 BATTERY		M		0	60	MIN							P	
	U			PROPELLANT UTILIZ														
	U	1091	V	ERROR RATIO DEMOD OP		S		M20	20	VDC	.5	20					P	
	U	1200	X	LO2 100% SLUG COF-1		R		OFF	ON	VDC		STP	PEN 72				P	
	U	1201	X	LO2 TOPG HI CTL-1		R		OFF	ON	VDC		STP	PEN 70				P	
	U	1202	X	LO2 TOPG LO CTL-1		R		OFF	ON	VDC		STP	PEN 68				P	
	U	1203	X	LO2 95% RAPID LOAD-1		R		OFF	ON	VDC		STP	PEN 66				P	
	U	1204	X	FUEL 100% SEC CTL		R		OFF	ON	VDC		STP	PEN 65				P	
	U	1205	X	FUEL 100% PRI CTL		R		OFF	ON	VDC		STP	PEN 64				P	
	U	1206	X	FUEL 95% SEC CTL		R		OFF	ON	VDC		STP	PEN 63				P	
	U	1207	X	FUEL 95% PRI CTL		R		OFF	ON	VDC		STP	PEN 62				P	
	U	1208	X	LO2 100% SLUG COF-2		R		OFF	ON	VDC		STP	PEN 73				P	
	U	1209	X	LO2 TOPG HI CTL-2		R		OFF	ON	VDC		STP	PEN 71				P	
	U	1210	X	LO2 TOPG LO CTL-2		R		OFF	ON	VDC		STP	PEN 69				P	
	U	1211	X	LO2 95% RAPID LOAD-2		R		OFF	ON	VDC		STP	PEN 67				P	

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[redacted]

CONVAIR (ASTRONAUTICS) DIVISION
GENERAL DYNAMICS CORPORATION

WS-107A-1

INSTRUMENTATION CONFIGURATION

SERIES E ARTICLE 18

AMR

PREPARED BY TEST PLANNING

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GD

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
A	16 Mar '61	WSB	ADDITIONS:	ALL TABS
			A7810, A7820, A7830, A9250, A9260,	
			A282T, A294T, A933T, A934T, A935T,	
			F1309D, F34P, F212P, F1301P, F1302P,	
			F17T, F371T, F374T, F375T, F376T,	
			F377T, F771T, F773T, F774T, F775T,	
			F776T, F777T, F780T, F781T, F782T,	
			H130P, H185P, H191P, H212P, H244P,	
			H1360P, H1187X, H1188X, I1606V,	
			M1356X, M1932X, M1933X, M1979X,	
			P12060, P12080, P12090, P1001P, P1002P,	
			P1003P, P1004P, P1091P, P1092P, P1093P,	
			P1094P, P1020T, P1054T, H414P, U409V.	
			REASONS FOR REVISION "A" CHANGES	
A	16 Mar '61	WSB	DELETIONS:	ALL TABS
			F92T, F93T, F94T, M1314T, P1010P,	
			P1011P, P1232P, P1465P, P1707T, P1713T,	
			P1714T, S1049X, Z2E	

FOREWORD

This report has been published in accordance with contractual requirements as cited in Convair-Astronautics Report ZM-7-289. It describes the instrumentation released for Missile 18-E as of 16 March 1961. A

Information presented here will be used by Air Force, Associate Contractors, Design, Operation, and Field Test Groups. Measurement modification will either originate in the Instrumentation Section of the Test Planning Group or will be submitted as a recommendation to this group.

TABLE OF CONTENTS

SUMMARY

The instrumentation configuration for this missile has been established through a study of program test objectives, systems analysis, and operating considerations. A discussion of missile instrumentation and associated characteristics has been summarized in Report AZC-27-059. For a detailed description of the various missile systems, test objectives, and general test program see Report AE60-0442.

The specific measurements to be transmitted via telemeter have been tabulated and are listed in Sections 8 and 9 in terms of instrumentation systems and telemeter channel assignments.

In addition to the telemetry, the landline instrumentation program for this missile has been included in this report in the form of a master tabulation of landline measurement characteristics, (Section 10).

To clarify specific measurements, instrumentation location schematics have been included in Report AZC-27-059, Section 7.

There are a total of 205 telemetered measurements on 41 channels in this missile divided as follows:

	ACCEL	DEFL	POS	PRES	TEMP	VOLT	DIG. POS	MISC	TOTAL
A/FRM					34			5	39
PNEU				8	19				27
GUID						2		2	4
HYD				7					7
INER. GUID	6	4	5	1	5	11	8	5	45
PROP		2		20	5		3	3	33
A/P SYS		13					2	3	18
MISC	1	1		2	2	8	14	4	32
TOTAL	7	20	5	38	65	21	27	22	205

There are also 181 measurements recorded and displayed via 181 landline channels.

REASONS FOR REVISION "A" CHANGES

I. Data obtained from the following temperature measurements will reveal total heating rates, relative heating intensity of a hot spot between the engines, the relative heating intensities of the outer and inner heat shield peripheries, and model scaling laws applicable to recirculation predictions.

MEAS NO.	DESCRIPTION
ADD	
A933T	AEDC AFT SHIELD CALOR
A934T	AEDC AFT SHIELD CALOR
A935T	AEDC AFT SHIELD CALOR

II. It is important to know the weight of LOX boiloff during flight for accurate evaluation of the over-all effect on missile performance resulting from the removal of intermediate bulkhead insulation. Seventeen (17) temperature and 2 pressure measurements have been added to provide this data.

III. Four measurements have been added to determine that proper sequencing of the LOX slug transfer valves occurs.

MEAS NO.	DESCRIPTION
ADD	
N1356X	SLG CHG LO_2 LOW LEVEL
N1932X	LO_2 TPNG VLV CLOSED
N1933X	LO_2 TPNG VLV OPEN
N1979X	PRESS VLV CLOSED

IV. Computer Reset I1606V, demonstrates the start of computer cycling; it is a convenient initial operating time reference to be used with measurement I1510W, ELAPSED TIME.

V. Due to the free launch configuration, the E Series missile lifts off the pad when the engine thrust reaches approximately 60% of nominal and the engine start sequence is still incomplete. In order to obtain continuous, high frequency response data during the entire engine start sequence for failure and performance analysis purpose, a trailing wire instrumentation umbilical will be provided.

The trailing umbilical will be attached to the missile for at least ten feet of vertical travel and supply data for a minimum of three seconds after engine start. The data will be recorded on a FM magnetic tape to allow the highest frequency response and most comprehensive data reduction methods to be utilized. The selected measurements that will be transmitted via the trailing umbilical are: Accelerometers to be mounted on booster (P1208O, P1209O) and sustainer (P1206O) engine LOX domes to detect excessive engine vibration caused by combustion instability, propellant surges, and other transient phenomena, pressure instrumentation in the booster engine LOX (P1001P, P1003P) and fuel (P1002P, P1004P) turbopump inlets to establish interface requirements, propellant ducting integrity, and turbopump performance, booster high pressure propellant ducting integrity, main propellant valve operation, turbopump action, and engine transient behavior to be detected by pressure measurement in the booster LOX (P1091P, P1092P) and fuel (P1093P, P1094P) injection manifold.

The booster engine LOX pump inlet temperatures (P1020T, P1054T) will be monitored by the regular landline instrumentation system during the launch countdown. This information will assure that turbopump starting NPSH requirements are satisfied and determine the adequacy of the LOX topping and slug systems.

VI. The following measurements are part of the "E Series" pneumatic regulator study. The purpose of the measurements is to obtain accurate inflight data of vibrational input at the regulator mounting base and on the regulator. This data will be used to supplement laboratory testing to establish vibrational specification.

MEAS. NO.	DESCRIPTION
A781O	BASE LO$_2$ TK P REG RAD
A782O	BASE LO$_2$ TK P REG LG
A783O	BASE LO$_2$ TK P REG TG
A925O	LO$_2$ TK P REG LONG
A926O	LO$_2$ TK P REG TANG

The transducers are Gulton KA-1006 G systems, composed of an A-395 TMU-1 accelerometer and a FT-521 U amplifier. These are a piezoelectric type with a nominal sensitivity of 833 MV/G. The amplifier gain is variable from 5 to 50. The complete system sensitivity is flat to ± 3% over the temperature range of -30 to +185 DGF, and has a cross-axis sensitivity of less than 5%. The ranges are plus to minus 30 G's with frequency response to 1200 cps. The telemetering is being accomplished by the "burst technique" over channel C. The "burst technique" is implemented by connecting a series of commutator pins together. Channel C is commutated at 1/8 rps and the output from each accelerometer is monitored for approximately 1 second every 8 seconds.

VII. Due to the 13E failure, further instrumentation is required for the hydraulic and propellant utilization systems. Therefore measurement H414P, PU VLV CLS SERVO, and U409V, PU VALVE COMMAND VOLT have been added.

VIII. To provide sufficient data to analyze the performance of the airborne hydraulic system, the following instrumentation has been added.

MEAS NO.	DESCRIPTION	CHANNEL
ADD		
H130P	S HYD PUMP DISCH	1.13.1
H185P	S HYD PUMP INLET	1.12.9
H191P	S HI PP TO MANIFOLD	1.12.31
H212P	VERNIER RETURN	2.11.51
H224P	B HYD SYS LO PRESS	2.11.53
H1360P	HPU SUSTAINER RETURN	
H1187X	BSTR OIL EVACUATION	
H1188X	SUST OIL EVACUATION	

IX. The following measurements duplicate previously assigned numbers. Therefore, they are deleted

DELETE	
F92T	LO_2 CTR STA 504
F93T	LO_2 CTR STA 540
F94T	LO_2 CTR STA 600
F96T	LO_2 CTR STA 720

X. These measurements, applicable only on FRF missiles, have been deleted on 18E.

MEAS NO.	DESCRIPTION
DELETE	
P1010P	B1 LUBE OIL INJ MAN
P1011P	B2 LUBE OIL INJ MAN
P1232P	S LO_2 SEAL CAVITY
P1465P	S LO PR LUBE OIL MAN
P1709T	SGG COMBUSTOR
P1713T	B1 GAS GEN CUTOFF
P1714T	B2 GAS GEN CUTOFF
P1227X	LOX DOME PURGE
P1228X	IGNITER FUEL PURGE
P1785X	B SECONDARY SHUTDOWN
P1226X	PNEUMATICS CUTOFF

XI. Due to the complexity in making and calibrating measurement Z2E, KLYSTROM PW OUTPUT, it has been deleted.

XII. The roll program is accomplished by ARMA signal, which function is monitored by measurement I529V. Therefore measurement S1049X, PROGRAMMER ROLL SIGNAL has been deleted.

XIII. Because there is no further test data needed on LOX slug transfer units at AMR, measurement N1314T, SLUG CHG LO_2 DISC has been deleted.

SECTION 8

MISSILE INSTRUMENTATION BY SYSTEM

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by system.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

UNITS OF FUNCTION

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

A	F	1	P	LO_2 TANK HELIUM	1	11	35	0	45	PIA	SLO	7 01723 11		780	2		P	27-11608
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA	SLO	7 01723 13		935	Y		P	27-11609
A	F	135	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA	SLO	7 0173. 3		1243	4		P	27-16500
A	F	260	P	B TANK HE BOTTLES LO	1	11	17	15	415	PIA	SLO	7 01727 1		1238	1		P	27-11600
A	F	261	P	S TANK HE BOTTLE LO	1	11	21	15	115	PIA	SLO	7 01727 1		1233	2		P	27-16506

MEASUREMENT NUMBER

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number assignment for the applicable measurement.

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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Vehicle System	Measurement Number	Type Measurement	Description	Tel. Sampling No.	Tel. Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change / Response	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Number
A			AIRFRAME														
A	781	O	BASE LOX TK P REG RO	1	C	1	M30	30	G	58	12C	27 01277 15		1220	A	P	27-11945
A	782	O	BASE LOX TK P REG LG	1	C	9	M30	30	G	58	12C	27 01277 15		1220	A	P	27-11945
A	789	O	BASE LOX TK P REG TG	1	C	17	M30	30	G	58	12C	27 01277 15		1220	A	P	27-11945
A	925	O	LOX TK P REG RADIAL	1	C	25	M30	30	G	58	12C	27 01277 15		1220	A	P	27-11945
A	926	O	LOX TK P REG TANG	1	C	33	M30	30	G	58	12C	27 01277 15		1220	A	P	27-11945
A	282	T	LOX FWD BLKHD 01	1	11	45	150	800	DGR	48	SLO	55 01115	5 27225	481	1	P	27-11891
A	294	T	LOX FWD BLKHD 03	1	11	41	150	800	DGR	48	SLO	55 01115	5 27226	481	3	P	27-11891
A	409	T	BLACK CALOR QUAD II	3	10	5	0	1000	DGF	48	SLO	27 11912 1		1269	1	P	27-11843
A	412	T	BLACK CALOR QUAD IV	3	10	7	0	1000	DGF	48	SLO	27 19912 1		1269	4	P	27-11843
A	438	T	38 GM CALOR QUAD IV	3	10	9	0	1000	DGF	48	SLO	27 19912 1		1269	4	P	27-11843
A	439	T	38 GM CALOR QUAD I	3	10	11	0	1000	DGF	48	SLO	27 19912 1		1269	1	P	27-11843
A	440	T	19 GM CALOR QUAD IV	3	10	13	0	1000	DGF	48	SLO	27 19912 1		1269	4	P	27-11843
A	443	T	19 GM CALOR QUAD I	3	10	3	0	1000	DGF	48	SLO	27 19912 1		1269	1	P	27-11843
A	458	T	AIG POD AMBIENT SKIN	3	11	49	500	1500	DGR	40	SLO	CR/CN		1088	3	P	27-11846
A	464	T	THST STRUCTURE OTBD	3	10	1	0	1000	DGF	48	SLO	CR/CN		1170	4	P	27-11843
A	467	T	B2 HAT SECTION INBRD	3	10	37	0	1000	DGF	48	SLO	CR/CN		1281	2	P	27-11843
A	470	T	B2 HAT SECTION OTBRD	3	10	17	0	1000	DGF	48	SLO	CR/CN		1281	2	P	27-11843
A	473	T	HEAT SHIELD OUTER	3	10	15	0	1000	DGF	48	SLO	CR/CN		1269	3	P	27-11843
A	476	T	HEAT SHIELD INNER	3	10	39	0	500	DGF	48	SLO	CR/CN		1269	3	P	27-11843
A	638	T	AFT SIDE A FRAME 02	1	11	13	M100	300	DGF		SLO	27 01287	3 24693	1220	2	P	27-11793
A	682	T	#1 AIG POD INSUL OUT	3	11	11	500	1500	DGR	40	SLO	CR/CN		1012	2	P	27-11846
A	683	T	#1 AIG POD INSUL IN	3	11	13	500	1500	DGR	40	SLO	CR/CN		1012	2	P	27-11846
A	684	T	#2 AIG POD INSUL OUT	3	11	15	500	1500	DGR	40	SLO	CR/CN		1091	2	P	27-11846
A	685	T	#2 AIG POD INSUL IN	3	11	17	500	1500	DGR	40	SLO	CR/CN		1091	2	P	27-11846
A	686	T	#3 AIG POD INSUL OUT	3	11	19	500	1500	DGR	40	SLO	CR/CN		1088	2	P	27-11846
A	687	T	#3 AIG POD INSUL IN	3	11	21	500	1500	DGR	40	SLO	CR/CN		1088	2	P	27-11846
A	688	T	#4 AIG POD INSUL OUT	3	11	23	500	1500	DGR	40	SLO	CR/CN		1086	3	P	27-11846
A	689	T	#4 AIG POD INSUL IN	3	11	43	500	1500	DGR	40	SLO	CR/CN		1086	3	P	27-11846
A	690	T	#5 AIG POD INSUL OUT	3	11	45	500	1500	DGF	40	SLO	CR/CN		1099	2	P	27-11846
A	691	T	#5 AIG POD INSUL IN	3	11	47	500	1500	DGR	40	SLO	CR/CN		1099	2	P	27-11846

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REPORT NO. AZC-27-059-1 [redacted]

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 18E REPORT NO AZC-27-059-13 DATE 16 MAR 61 PAGE 2

1	2	3	4	DESCRIPTION	6	7	8	RANGE LOW	RANGE HIGH	10	ACCURACY	12	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	16	CARD CODE	DRAWING NUMBERS
	A	692	T	B1 NACELLE INSUL FWD	3	10	19	500	1500	DGR	60	SLO	CR/CN		1163	4	P	27-11063
	A	693	T	B2 NACELLE INSUL FWD	3	10	21	500	1500	DGR	40	SLO	CR/CN		1163	4	P	27-11063
	A	694	T	B1 NACELLE INSUL CTR	3	10	23	500	1500	DGR	40	SLO	CR/CN		1196	4	P	27-11063
	A	695	T	B2 NACELLE INSUL CTR	3	10	31	500	1500	DGR	40	SLO	CR/CN		1196	2	P	27-11063
	A	696	T	B1 NACELLE INSUL AFT	3	10	33	500	1500	DGR	40	SLO	CR/CN		1213	4	P	27-11063
	A	697	T	B2 NACELLE INSUL AFT	3	10	35	500	1500	DGR	40	SLO	CR/CN		1213	2	P	27-11063
	A	933	T	AEDC AFT SHLD CALOR	3	10	41	0	1300	DGF	4	SLO	FE/CN		1268	3	P	27-11923
	A	934	T	AEDC AFT SHLD CALOR	3	10	43	0	1300	DGF	4	SLO	FE/CN		1268	4	P	27-11923
	A	935	T	AEDC AFT SHLD CALOR	3	10	45	0	1300	DGF	4	SLO	FE/CN		1268	4	P	27-11923
	D			RANGE SAFETY SYSTEM														
	D	1	V	RSC CUTOFF OUTPUT	1	6	5	0	31	VDC	3	SLP					N	
	D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC	3	STP					P	
	D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	100K	UV	90	SLO		88			P	
	D	3	E	RSC DESTRUCT OUTPUT	2	E	95	0	33	VDC		STP					P	
	E			ELECTRICAL POWER SYS														
	E	30	0	400 CYCLE AC PWRSUP	1	1		370	430	CPS	4	SLO		5			P	
	E	20	V	MGL SYSTEMS INPUT	1	13	11	0	30	VDC	1.0	SLO		5			P	
	E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC	1.0	SLO		5			P	
	E	53	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC	1.0	SLO		5			P	
	F			PNEUMATIC SYSTEM														
	F	3	P	LO2 TANK HELIUM	1	13	33	0	45	PIA	1.0	SLO	7 01723	11 56797	606	3	P	27-11679
	F	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA	3	SLO	01723	13 57417	968	3	P	27-11683
	F	34	P	FUEL P [illegible] ORFC DP	1	13	51	0	7	PID	0..	SLO	01280	5			P	
	F	63	P	LO2 TK HE LIR @ ORFC	1	A	51	0	45	PIA	.5	SLO	27 01243	5 16361	1127	4	P	27-11732
	F	145	P	A CTL HE BTL DISCH	1	12	17	0	3500	PIA	175	SLO	7 01720	5 50795	1213	2	P	27-11456

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CONVAIR ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 18E REPORT NO. AZC-27-0.9-18 DATE 14 MAR 61 PAGE 3

	SYSTEM	MEAS. NO.	TYPE	DESCRIPTION	TELEMETER NO.	SUBCARRIER NO.	COMMUTATOR PIN NO.	RANGE LOW	RANGE HIGH	UNITS & FUNCTION	ACCURACY	FREQUENCY RESPONSE	TYPE OF TRANSDUCER		SERIAL NO.	STATION NO.		CAL	DRAWING NUMBER
	F	147	P	LO2 PRESS ORFC DP	1	A	49	0	5	PID	.1	SLO	27 01200	1	3940	1127	3	P	27-12732
A	F	212	P	FUEL PRESS ORFC IN	2	11	37	40	70	PIG	2.1	SLO	27 01263	7				P	
	F	246	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA	105	SLO	7 01720	5	60665	1187	4	P	27-1160.
A	F	17	T	FUEL PRESS ORFC IN	1	11	43	0	500	DGF	12	SLO	7 01684	3				P	
	F	97	T	LOX TK CTR STA 787	3	11	41	150	800	DGR	45	SLO	CR/CN			787	Z	P	27-11824
	F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLO	7 01684	3	R307	1203	4	P	27-11682
	F	144	T	LO2 PRESS ORFC IN	1	11	11	0	500	DGF		SLO	7 01684	3	14L	1121	3	P	27-11732
	F	247	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01683	5	104L	1273	4	P	27-11682
A	F	371	T	LOX TK ULG STA 691	3	11	53	150	1050	DGR	45	SLO	CR/CN			691	Z	P	27-11824
A	F	374	T	LOX TK ULG STA 807	3	11	1	150	1050	DGR	45	SLO	CR/CN			807	Z	P	27-11824
A	F	375	T	LOX TK ULG STA 827	3	11	3	150	1050	DGR	45	SLO	CR/CN			827	Z	P	27-11824
A	F	376	T	LOX TK ULG STA 846	3	10	47	150	1050	DGR	45	SLO	CR/CN			846	Z	P	27-11824
A	F	377	T	LOX TK ULG STA 867	3	10	49	150	1050	DGR	45	SLO	CR/CN			867	Z	P	27-11824
	F	771	T	LOX TANK HE INLET	1	11	1	500	1000	DGR	4	SLO	7 01684	3	21L	510	3	P	27-11900
B	F	773	T	LOX TK ULG STA 540	3	11	31	150	800	DGR	45	SLO	CR/CN			540	Z	P	27-11604
B	F	774	T	LOX TK ULG STA 570	3	11	33	150	800	DGR	45	SLO	CR/CN			570	Z	P	27-11604
B	F	775	T	LOX TK ULG STA 600	3	11	35	150	800	DGR	45	SLO	CR/CN			600	Z	P	27-11604
B	F	776	T	LOX TK ULG STA 630	3	11	51	150	1050	DGR	45	SLO	CR/CN			630	Z	P	27-11824
B	F	777	T	LOX TK ULG STA 660	3	11	37	150	800	DGR	45	SLO	CR/CN			660		P	27-11824
B	F	780	T	LOX TK ULG STA 720	3	11	39	150	800	DGR	45	SLO	CR/CN			720	Z	P	27-11824
B	F	781	T	LO2 TK ULG STA 740	3	10	51	150	1050	DGR	45	SLO	CR/CN			740	Z	P	27-11824
B	F	782	T	LO2 TK ULG STA 762	3	10	53	150	1050	DGR	45	SLO	CR/CN			762	Z	P	27-11824
	G			RADIO GUIDANCE SYS															
	G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA	.03	SLO						P	
	G	502	E	MOD III RB RF OUTPUT	1	11	3	0	15	E	.45	SLO						P	
	G	503	V	MOD III PB AGC	1	11	17	0	M4.8	VDC	.15	SLO							
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO						P	
	H			HYDRAULIC SYSTEM															

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET CONFIDENTIAL

MISSILE 18E REPORT NO. AZC-27-059-18 DATE 16 MAR 61 PAGE 4

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No.	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quantity	Card Code	Drawing Numbers
	[illegible]	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA	140	SLO	7 01751 9	69618	1179	[illegible]	P	27-11721
	H	130	P	S HYD PUMP DISCH	1	13	1	0	3500	PIA	5%	SLO	7 01720 5		1234	2	P	27-11720
	H	140	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA	45	SLO	7 01720 5	60755	1213	2	P	27-11550
	H	189	P	S HYD PUMP INLET	1	12	9	0	200	PIA	5%	SLO	27 01243 11		1241	3	P	27-11720
	H	191	P	S HI PR TO MANIFOLD	1	12	31	0	3500	PIA	5%	SLO	7 01720 5		1208	1	P	27-11651
	H	212	P	VERNIER RETURN	2	11	51	0	200	PIA	5%	SLO	27 01243 11		1208	4	P	27-11651
	H	224	P	B HYD SYS LO PRESS	2	11	53	0	200	PIA	5%	SLO	27 01243 11		1180	4	P	27-11897
	H	414	P	PU VLV CLS-SERVO	1	A	21	0	3500	PIG	70	10					P	
	I			INERTIAL GUIDANCE														
	I	513	A	ACCEL XF1 DIRECT	3	C		M12	12	G							P	
	I	514	A	ACCEL XF2 DIRECT	3	E		M12	12	G							P	
	I	516	A	ACCELEROMETER YF1	2	A		M12	12	G							P	
	I	517	A	ACCELEROMETER ZF1	3	13		M12	12	G							P	
	I	518	A	ACCELEROMETER YF2	2	C		M12	12	G							P	
	I	520	A	ACCELEROMETER ZF2	3	A		M12	12	G							P	
	I	549	D	PITCH SERVO ERROR	2	6		M4.1	4.1	MIN		20					P	
	I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20					M	
	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	MIN		100					P	
	I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
	I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100					M	
	I	552	D	REDNDT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35					P	
	I	552	D	REDNDT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
	I	505	H	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
	I	506	H	COMPUTER POSITION Y	1	E	F	M300	500	NM		10K					P	F
	I	507	H	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
	I	508	H	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	
	I	509	H	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
	I	102	L	COMPUTER VELOCITY X	1	[illegible]	A	0	22K	F/S		10K					P	

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MISSILE INSTRUMENTATION LOG SHEET

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE OF MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBER
	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
	I	572	P	BINNACLE	1	12	19	0	4	PIA		SLO					P	
	I	531	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	
	I	532	T	GYRO 2	1	12	5	M6.3	6.3	DGC		SLO					P	
	I	533	T	BINNACLE	1	12	9	0	100	DGC		SLO					P	
	I	534	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
	I	535	T	COMPUTER	1	12	16	0	50	DGC		SLO					P	
	I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	
	I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10					X	
	I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
	I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6					M	
	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
	I	540	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		SLO					P	
	I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
	I	543	V	COMPUTER H50 PSUP	3	9		M55	0	VDC		SLO					P	
	I	544	V	COMPUTER M16.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
	I	545	V	COMPUTER M10 PSUP	1	12	41	M12	M7.5	VDC		SLO					P	
	I	547	V	COMPUTER 4 PSUP	1	13	43	0	6	VDC		SLO					P	
	I	548	V	COMPUTER 38 PSUP	1	12	41	0	42	VDC		SLO					P	
	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	
	I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
	I	510	W	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
	I	581	U	TIME T	2	8	S					BLP					P	
	I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
	I	521	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP					P	
	I	522	X	[illegible] ENGINE COF SIG	1	12	45	OFF	ON			STP					P	

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 18E   REPORT NO. AZC-27-059-18   DATE 16 MAR 61   PAGE 6

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	I	522	X	S ENGINE COF SIG	2	5	5	OFF	ON			BLP					P	
	I	523	X	SGM COF REL 'S	2	10	5	OFF	ON			BLP					P	
	I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
	I	26	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
	I	527	X	PRE-ARM RELAY CLOS	1	12	39	OFF	ON			STP					P	
	I	537	X	COMPUTER REDUNDANCY	2	7	5	OFF	ON			BLP					P	
	I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
	M			MISCELLANEOUS														
	M	79	A	MSL AXIAL ACCEL FINE	3	5		M.3	0.5	G	.05	20	87 93900 063	2949F	1057	4	P	27-11782
	M	143	D	BOOSTER SEPARATION	3	?		0	8	IN	.25	14	7 01676 1	LU151	1131	1	P	27-11723
	M	78	X	STROBE LIGHT OCCUR	1	C	95			VDC		STP					P	
	P			PROPULSION SYSTEM														
	P	83	B	B2 PUMP SPEED	1	2		5680	6400	RPM	60	SLO	27 01267 1	10	1198	2	P	27-11722
	P	84	B	B1 PUMP SPEED	2	2		5680	6400	RPM	60	SLO	27 01267 1	6	1198	4	P	27-11721
	P	349	B	S PUMP SPEED	1	3		9.9	11.2	KPM	.1	SLO	27 01264 3	149N	123A	3	P	27-11720
	P	528	D	S MAIN FUEL VALVE	1	A	65	0	90	DEG	2	SLO	NAA				P	
	P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG	2	SLO	NAA		1205	3	P	27-17564
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA	16	150	7 01731 5	64370	1235	1	P	27-11728
	P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA	40	SLO	7 01720 3	43255	1208	1	P	27-11651
	P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA	10	SLO	7 01737 3	14005	1127	4	P	27-11699
	P	29	P	V2 THRUST CHAMBER	1	A	35	0	400	PIA	10	SLO	7 01737 3	15295	1127	2	P	27-11699
	P	30	P	VERNIER LO2 TANK	1	13	13	0	1000	PIA	40	SLO	7 01720 3	35525	1208	1	P	27-11651
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA	40	15	7 01731 5	74658	1164	3	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	PIA	40	15	7 01731 5	4536	1173	1	P	27-11721
	P	96	P	S LO2 PUMP INLET	1	13	17	0	150	PIA	3.8	SLO	27 01243 9	16122	1235	1	P	27-11720

MISSILE INSTRUMENTATION LOG SHEET

MISSILE 16E REPORT NO. AZC-27-059-18 DATE 16 MAR 61 PAGE 7

Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No.	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No.	Quadrant	Card Code	Drawing Numbers
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	800	PIA	18	15	7 01731 3	74958	1244	2	P	27-11684
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	800	PIA	18	15	7 01731 3	53728	1244	1	P	27-11684
	P	91	P	B1 LO2 INJ MANIFOLD	1	13	39	0	1000	PIA	15	SLO	7 01731 5	74118	1244	1	P	27-11684
	P	92	P	B2 LO2 INJ MANIFOLD	1	13	15	0	1000	PIA	15	SLO	7 01731 1	75128	1244	2	P	27-11684
	P	195	P	B1 GAS GEN COMBUSTOR	1	12	29	0	1000	PIA	25	SLO	7 01731 5	57648	1173	1	P	27-11721
	P	184	P	B2 GAS GEN COMBUSTOR	1	12	33	0	1000	PIA	25	SLO	7 01731 5	51988	1144	3	P	27-11722
	P	279	P	B2 LO2 PR LUB OIL MN	2	11	43	0	125	PIA	5	SLO	27 01243 9	16152	1144	3	P	27-11722
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA	38	15	7 01731 7	61518	1235	1	P	27-11720
	P	337	P	S66 LO2 INJ MAN	1	A	31	0	1000	PIA	25	SLO	7 01731 5	68298	1235	1	P	27-11720
	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA	38	SLO	7 01731 7	57298	1235	1	P	27-11720
	P	351	P	S LO2 INJ MANIFOLD	1	13	49	0	1000	PIA	15	SLO	7 01731 5	60518	1235	1	P	27-11720
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIA	5	SLO	27 01243 9	15704	1173	1	P	27-11721
	P	530	T	S LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	8592	1197	3	P	27-11720
	P	671	T	TN SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	27 01287 3	24679	1222	4	P	27-11793
	P	709	T	SG3 COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 01247 3	51L	1234	4	P	27-11720
	P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247 3	124L	1210	1	P	27-11721
	P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247 3	77L	1210	3	P	27-11722
	P	347	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
	P	547	X	B1 CUTOFF RELAY	1	7	5	0	23	VDC		STP					P	
	P	548	X	COMPLETE COF RELAY	1	13	5	0	28	VDC		STP					P	
	S			AUTOPILOT SYSTEM														
	S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG	.2	5					P	
	S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG	.2	5					P	
	S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG	.2	5					P	
		203	D	B1 PITCH ROLL	1	7		M5	5	DEG	.5	10	7 01680 7	9228	1212	1	P	27-11721
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG	.5	30	7 01680 7	9228	1212	1	M	27-11721
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG	.5	10	7 01680 7	9628	1212	2	P	27-11722
	S	205	D	B1 YAW	1	6		M5	5	DEG	.5	10	7 01680 7	8988	1212	4	P	27-11721
	S	205	D	B1 YAW	2	11	5	M5	5	DEG	.5	30	7 01680 7	8938	1212	4	M	27-11721

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SECTION 8

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemetry No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	S	206	D	B2 YAW	2	E	19	M5	5	DEG	.5	10	7 01680 7	12118	1212	2	P	27-11722
	S	222	D	V1 PITCH	2	E	7	0	50	DEG	3	10	7 01414 1	10521	1123	4	P	27-11699
	S	223	D	V2 PITCH	2	E	5	0	50	DEG	3	10	7 01414 1	10852	1123	2	P	27-11699
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG	7	10	27 01209 1	349H	1129	4	P	27-11699
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG	7	10	27 01209 1	229H	1129	2	P	27-11699
	S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG	.3	6	7 01680 9	7098	1210	1	P	27-11720
	S	256	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG	.3	30	7 01680 9	7098	1210	1	M	27-11720
	S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG	.3	6	7 01680 3	12598	1210	2	P	27-11720
	S	257	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG	.3	30	7 01680 3	12598	1210	2	M	27-11720
	S	92	R	ROLL RATE GYRO	1	10		M8	8	D/S	.3	15		68			P	
	S	92	R	ROLL RATE GYRO	2	11	13	M8	8	D/S	.3	15		68			M	
	S	93	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S	.3	15		68			P	
	S	93	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S	.3	15		68			M	
	S	94	R	YAW RATE GYRO SIG	1	8		M6	6	D/S	.3	15		68			P	
	S	94	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S	.3	15		68			M	
	S	181	X	TANK FRAG DESTRUCT	1	A	95	OFF	ON	VDC		STP					P	
	S	248	X	A/P F6 SWITCH 17	1	13	3	OFF	ON	VDC		STP					P	
	T			TELEMETERING														
	T	4	T	ARMA T/C REF JUNCT	1	11	23	0	200	DGF	8	SLO	27 01287 1	24939	1055	2	P	27-11046
	T	103	T	BOOSTER T/C REF	1	11	19	0	200	DGF	8	SLO	27 01287 1	412A	1180	4	P	27-11043
	U			PROPELLANT UTILIZ														
	U	80	P	LO2 TANK HEAD	1	13	31	0	5	PID		SLO	27 01280 1	8001Y	948	3	P	27-11603
	U	81	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01280 1	3200	948	3	P	27-11603
	U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC	.5	SLO		5			P	
	U	409	V	PU VLV COMMAND VOLT	3	11	29	M.5	.6	VDC		SLO					P	
	Y			DECOY SYSTEM														

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	[illegible]	Station No	Quadrant	Card Code	Drawing Number
	Y	102	L	EJECTION VELOCITY	2	E	75	ON	OFF								P	
	Y	102	L	EJECTION VELOCITY	3	12	11	ON	OFF								P	
	Y	156	V	BATTERY VOLTAGE	3	12	9	ON	OFF								P	
	Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
	Y	103	X	BAROSWITCH	3	12	1	ON	OFF								P	
	Y	104	X	TIMER START CYCLE	3	12	1	ON	OFF								P	
	Y	105	X	BOOSTER ACCEL CYCLE	3	12	1	ON	OFF								P	
	Y	106	X	SUSTAINER HALF CYCLE	3	12	1	ON	OFF								P	
	Y	141	X	EJECT SURE SIG	2	E	85	ON	OFF								P	
	Y	141	X	EJECT SURE SIG	3	12	11	ON	OFF								P	
	Y	150	X	FAIRING RELEASE	3	12	3	ON	OFF								P	
	Y	151	X	UNLATCH SIGNAL	3	12	3	ON	OFF								P	
	Y	152	X	MOTOR START SIGNAL	3	12	3	ON	OFF								P	
	Y	153	X	EJECT SIGNAL	3	12	3	ON	OFF								P	
	Y	154	X	TUBE ORIENTATION	3	12	5	ON	OFF								P	
	Y	155	X	TUBE UNLATCH	3	12	7	ON	OFF								P	
	Z			AZUSA														
	Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM	50	3					P	

SECTION 9

MISSILE INSTRUMENTATION BY CHANNEL

The Missile Instrumentation Log presented in this section contains the latest available characteristics of the individual measurements. In addition, the telemetering channel assignments are included. Note that this section is listed by channel.

VEHICLE

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated, description of the measurement.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

UNITS OF FUNCTION

A	P	29	P	V2 THRUST CHAMBER	1	11	5	0	400	PIA		SLO	7 01737 1		1128	2		P	27-11614
A	F	125	P	B CTL PNEU REG OUT	1	11	7	0	1000	PIA		SLO	7 01731 3		1243	4		P	27-16500
A	F	3	P	FUEL TANK HELIUM	1	11	9	0	100	PIA		SLO	7 01723 13		925	Y		P	27-11609
A	P	671	T	TH SECT AMB QUAD 4	1	[illegible]	11	100	700	DGF		SLO	7 01684 9		1230	4		P	27-11599

MEASUREMENT NUMBER

FREQUENCY RESPONSE

Denotes the frequency response requirements of the instrumentation system for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

TELEMETRY CHANNEL ASSIGNMENT

Indicates the telemeter, subcarrier and pin number for the applicable measurement.

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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CONVAIR-ASTRONAUTICS

MISSILE INSTRUMENTATION LOG SHEET

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VEHICLE SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
			COMM. RATE-CONT.	1	0	0											
E	50	Q	400 CYCLE AC PWRSUP	1	1		370	430	CPS	4	SLO		5			P	
P	83	B	B2 PUMP SPD	1	2		5680	6400	RPM	60	SLO	27 01267 1	10	1198	2	P	27-11722
P	369	B	S PUMP SPEED	1	3		9.9	11.2	KPM	±1	SLO	27 01266 3	1698	1236	3	P	27-11720
S	256	D	SUSTAINER YAW	1	4		M3.0	3.0	DEG	±3	6	7 01680 9	7858	1210	1	P	27-11720
S	257	D	SUSTAINER PITCH	1	5		M3.0	3.0	DEG	±3	6	7 01680 3	12598	1210	2	P	27-11720
S	205	D	B1 YAW	1	6		M5	5	DEG	±5	10	7 01680 7	8968	1212	A	P	27-11721
D	1	V	RSC CUTOFF OUTPUT	1	6	5	0	31	[illegible]		3 BLP					M	
S	203	D	B1 PITCH ROLL	1	7		M5	5	DEG	±5	10	7 01680 7	9228	1212	1	P	27-11721
P	567	X	B1 CUTOFF RELAY	1	7	5	0	28	VDC		STP					P	
S	54	R	YAW RATE GYRO SIG	1	8		M6	6	D/S	±3	15		68			P	
S	53	R	PITCH RATE GYRO SIG	1	9		M6	6	D/S	±3	15		68			P	
S	52	R	ROLL RATE GYRO	1	10		M8	8	D/S	±3	15		68			P	

[illegible]

[redacted]

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				DESCRIPTION				MEASUREMENT RANGE LOW	HIGH	UNITS	ACCURACY		TYPE OF TRANSDUCER	SERIAL NO	STATION NO			DRAWING NUMBER
				COMM. RATE 2.5 RPS	1	11	0											
	P	771	T	LOX TANK HE INLET	1	11	1	500	1000	DGF	4	SLO	7 01684 3	11L	510	3	P	27-11900
	G	502	E	MOD III RB RF OUTPUT	1	11	3	0	15	E	.45	SLO					P	
	F	115	T	LO2 PRESS REG INLET	1	11	5	M200	200	DGF		SLU	7 01684 3	R307	1205	4	P	27-11682
	G	504	C	MOD III MAGNETRON	1	11	7	0	0.9	MA	.03	..?					P	
	P	530	T	6 LO2 PUMP INLET	1	11	9	M300	M270	DGF		SLO	7 01649 11	R552	1197	3	P	27-11720
	F	146	T	LO2 PRESS ORFC IN	1	..	11	0	500	DGF		SLO	7 01684 3	14L	1121	3	P	27-11732
	A	658	T	AFT SIDE A FRAME Q2	1	11	13	M100	300	DGF		SLO	27 01287 3	24693	1220	7	P	27-11793
					1	11	15											
	G	503	V	MOD III PB AGC	1	11	17	0	M4.0	VDC	.15	SLO					P	
	T	103	T	BOOSTER T/C REF	1	11	19	0	200	DGF	8	SLO	27 01287 1	612A	1180	4	P	27-11043
	G	579	V	MOD III RB AGC NO. 1	1	11	21					SLO					P	
	T	4	T	ARMA T/C REF JUNCT	1	11	23	0	200	DGF	8	SLO	27 01287 1	24939	1059	2	P	27-11046
				100% CALIB	1	11	25											
				0% CALIB	1	11	27											
				0% CALIB	1	11	29											
					1	11	31											
	G	502	E	CONNECTED TO 1 11 3	1	11	33											
	F	267	T	B TANK HE BOTTLES	1	11	35	M400	M250	DGF		SLO	7 01633 3	104L	1221	A	P	27-11682
	G	504	C	CONNECTED TO 1 11 7	1	11	37											
	P	671	T	TH SECT AMB QUAD 4	1	11	39	M100	300	DGF		SLO	27 01287 3	24679	1222	A	P	27-11793
	A	294	T	LOX FWD BLKHD Q1	1	11	41	150	800	DGR	48	SLO	55 01115 3	2772A	A81	3	P	27-11851
A	F	17	T	FUEL PRESS ORFC IN	1	11	43	0	500	DGF	12	SLO	7 01684 3				P	
	A	282	T	LOX FWD BLKHD Q1	1	11	45	150	800	DGR	48	SLO	55 01115 3	2722A	A81	1	P	27-11851
	G	503	V	CONNECTED TO 1 11 17	1	11	47											
					1	11	49											
	G	579	V	CONNECTED TO 1 11 21	1	11	51											
					1	11	53											
				SYNC & 100% CALIB	1	11	55											
				CONNECTED TO 1 11 55	1	11	56											
				CONNECTED TO 1 11 56	1	11	57											
				CONNECTED TO 1 11 57	1	11	58											
				CONNECTED TO 1 11 58	1	11	59											

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MISSILE 18E REPORT NO AZC-27-059-18 DATE 16 MAR 61 PAGE 3

Vehicle System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Cal or Response of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Number
			CONN. RATE 5 RPS	1	12	0											
I	531	T	GYRO 1	1	12	1	M6.3	6.3	DGC		SLO					P	
I	532	T	GYRO 2	1	12	3	M6.3	6.3	DGC		SLO					P	
I	533	T	BINNACLE	1	12	5	0	100	DGC		SLO					P	
				1	12	7											
H	83	P	S HYD PUMP INLET	1	12	9	0	200	PIA	38	SLO	27 01263	11	1241	5	P	27-11720
I	540	V	CONTROL 115 PHASE B	1	12	11	0	130	VDC		2					P	
I	534	T	ANALOG SIG CONVERTER	1	12	13	0	100	DGC		SLO					P	
I	572	P	BINNACLE	1	12	15	0	41	PIA		SLO					P	
F	265	P	S CTL HE BTL DISCH	1	12	17	0	3500	PIA	175	SLO	7 01720	5 58795	1213	2	P	27-11690
I	535	T	COMPUTER	1	12	19	0	50	DGC		SLO					P	
I	541	V	CONTROL M22.5 PSUP	1	12	21	0	25	VDC		SLO					P	
P	155	P	B1 GAS GEN COMBUSTOR	1	12	23	0	1000	PIA	25	SLO	7 01731	5 57442	1173	1	P	27-11721
			100% CALIB	1	12	25											
			0% CALIB	1	12	27											
			50% CALIB	1	12	29											
H	191	P	S HI PR TO MANIFOLD	1	12	31	0	3500	PIA	98	SLO	7 01720	9	208	1	P	27-11651
P	184	P	B2 GAS GEN COMBUSTOR	1	12	33	0	1000	PIA	25	SLO	7 01731	5 51988	1144	3	P	27-11722
I	527	X	PRE-ARM RELAY CLOS	1	12	35	OFF	ON			STP					P	
P	529	D	S MAIN LO2 VLV	1	12	37	0	90	DEG	2	SLO	NAA		1205	3	P	27-17564
I	544	V	COMPUTER M18.5 PSUP	1	12	39	M20	0	VDC		SLO					P	
I	548	V	COMPUTER 38 PSUP	1	12	41	0	42	VDC		SLO					P	
H	33	P	B1 HYD ACCUMULATOR	1	12	43	0	3500	PIA	140	SLO	7 01731	9 69618	1173	1	P	27-11721
I	525	X	PRE-ARM SIGNAL 1	1	12	45	OFF	ON			STP					P	
I	526	X	PRE-ARM SIGNAL 2	1	12	47	OFF	ON			STP					P	
I	521	X	VERN ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
I	522	X	S ENGINE COF SIG	1	12	49	OFF	ON			STP					P	
I	570	X	STAGING SIGNAL	1	12	49	OFF	ON			STP					P	
H	147	P	SUS/VERN HYD PRESS	1	12	51	0	3500	PIA	45	SLO	7 01720	5 60735	1213	2	P	27-11690
F	265	P	B TANK HE BOTTLES HI	1	12	53	0	3500	PIA	109	SLO	7 01722	5 40885	1187	4	P	27-11682
			SYNC & 100% CALIB	1	12	55											
			CONNECTED TO 1 12 55	1	12	56											
			CONNECTED TO [illegible] 56	1	12	57											
			CONNECTED TO 1 12 57	1	12	58											
			CONNECTED TO 1 12 58	1	12	59											

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			DESCRIPTION				LOW	HIGH	UNITS			TYPE OF TRANSDUCER	SERIAL NO	STATION NO		CARD CODE	DRAWING NUMBER
			COMM. RATE 5 RPS	1	13	0											
N	130	P	S HYD PUMP DISCH	1	13	1	0	3500	PIA	50	SLO	7 [illegible]		1236	2	P	27-11720
S	268	X	A/P PG SWITCH 17	1	13	3	OFF	ON	VDC		STP					P	
P	568	X	COMPLETE COF RELAY	1	13	5	0	28	V		STP					P	
D	1	V	RSC CUTOFF OUTPUT	1	13	7	0	31	VDC	3	STP					P	
P	567	X	S CUTOFF RELAY	1	13	9	0	28	VDC		STP					P	
E	28	V	RSC SYSTEMS INPUT	1	13	[illegible]	0	30	VDC	1.0	SLO					P	
P	50	P	VERNIER LOX TANK	1	13	13	0	1000	PIA	20	SLO	7 01720	3 35525	1204	2	P	27-11651
P	92	P	B2 LOX INJ MANIFOLD	1	13	15	0	1000	PIA	15	SLO	7 01731	1 75128	1244	2	P	27-11684
P	34	P	S LOX PUMP INLET	1	13	17	0	150	PIA	3.8	SLO	27 01245	9 16122	12[illegible]	2	P	27-11720
				1	13	19											
[illegible]	31	P	FUEL TANK HEAD	1	13	21	0	5	PID		SLO	27 01240	1 3230	948	3	P	27-11663
E	35	V	400 CYCLE AC PHASE C	1	13	23	105	125	VAC	1.0	SLO		5			P	
			100% CALIB	1	13	25											
			0% CALIB	1	13	27											
			50% CALIB	1	13	29											
[illegible]	80	P	LOX TANK HEAD	1	13	31	0	5	PID		SLO	27 01260	1 60019	948	3	P	27-11583
P	1	P	LOX TANK HELIUM	1	13	33	0	45	PIA	1.8	SLO	7 01723	11 54797	484	3	P	27-11679
				1	13	35											
P	3	P	FUEL TANK HELIUM	1	13	37	0	100	PIA	3	SLO	7 01723	15 5241Y	948	3	P	27-11683
P	91	P	B1 LOX INJ MANIFOLD	1	13	39	0	1000	PIA	15	SLO	7 01731	5 74118	1244	1	P	27-11684
E	565	V	COMPUTER M10 PSUP	1	13	41	M12	M7.5	VDC		SLO					P	
E	567	V	COMPUTER 6 PSUP	1	13	43	0	6	VDC		SLO					P	
				1	13	45											
P	27	P	VERNIER FUEL TANK	1	13	47	0	1000	PIA	[illegible]	SLO	7 01720	3 63255	1230	1	P	27-11651
P	93	P	S LOX INJ MANIFOLD	1	13	49	0	1000	PIA	15	SLO	7 0173[illegible]	5 60518	1235	1	P	27-11720
A F	34	P	FUEL PRESS ORFC DP	1	13	51	0	7	PID	0.5	SLO	27 0[illegible]202	3			P	
E	55	V	CONNECTED TO 1 13 23	1	13	53											
			SYNC & 100% CALIB	1	13	55											
			CONNECTED TO 1 13 55	1	13	56											
			CONNECTED TO 1 13 56	1	13	57											
			CONNECTED TO 1 13 57	1	13	58											
			CONNECTED TO 1 13 58	1	13	59											

[redacted]

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Vehicle System	Measurement Number	Type Measurement	Description	Telemeter No	Sub Carrier No	Commutator Pin No	Range Low	Range High	Units of Function	Accuracy	Rate of Change Frequency or Function	Type of Transducer	Serial No	Station No	Quadrant	Code	Drawing No.
			COMM. RATE 10 RPS	1	A	0											
E	51	V	400 CYCLE AC PHASE A	1	A	1	105	125	VAC	.40	SLO			5		P	
				1	A	3											
D	7	V	#1 RSC RF INPUT/AGC	1	A	5	15	100K	UV	[illegible]	[illegible]			88		P	
U	91	V	ERROR RATIO DEMOD OP	1	A	7	M5	5	VDC	.5	SLO			5		P	
S	61	D	ROLL DISPL GYRO SIG	1	A	9	M3	3	DEG	.2	5					P	
S	62	D	PITCH DISPL GYRO SIG	1	A	11	M3	3	DEG	.2	5					P	
S	63	D	YAW DISPL GYRO SIG	1	A	13	M3	3	DEG	.[illegible]	5					P	
				1	A	15											
Z	3	E	XPONDR RF INPUT/AGC	1	A	17	M120	0	DBM	5%	3					P	
Y	1	X	SEPERATION SIG	1	A	19	OFF	ON	MC		STP					P	
H	416	P	PU VLV CLS-SERVO	1	A	21	0	3500	PIG	70	10					P	
				1	A	23											
			100% CALIB	1	A	25											
			0% CALIB	1	A	27											
			50% CALIB	1	A	29											
P	337	P	SGG LO2 INJ MAN	1	A	31	0	1000	PIA	25	SLO	7 01731	5 66290	235	1	P	27-11726
P	28	P	V1 THRUST CHAMBER	1	A	33	0	400	PIA	10	SLO	7 01737	3 14005	127	A	P	27-11690
P	29	P	V2 THRUST CHAMBER	1	A	35	0	[illegible]	PIA	10	SLO	7 01737	3 151[illegible]	1127	2	P	27-11699
U	91	V	CONNECTED TO 1 A 7	1	A	37											
S	61	D	CONNECTED TO 1 A 9	1	A	39											
S	62	D	CONNECTED TO 1 A 11	1	A	41											
S	63	D	CONNECTED TO 1 A 13	1	A	43											
P	523	D	S MAIN FUEL VALVE	1	A	45	0	91	DEG	2	SLO	MAA				P	
Z	3	E	CONNECTED TO 1 A 17	1	A	47											
P	147	P	LO2 PRESS ORFC OP	1	A	49	[illegible]	3	PIO	.1	SLO	27 [illegible]	3 3090	1127	3	P	[illegible]
P	65	P	LO2 TK HE LIN C ORFC	1	A	51	[illegible]	45	PIA	.5	SLO	27 [illegible]	5 [illegible]	[illegible]	A	P	27-11732
				1	A	53											
			SYNC & 100% CALIB	1	A	55											
			CONNECTED TO 1 A 55	1	A	56											
			CONNECTED TO 1 A 56	1	A	57											
			CONNECTED TO 1 A 57	1	A	58											
			CONNECTED TO 1 A 56	1	A	59											
S	151	X	TANK FRAG DESTRUCT	1	A	65	OFF	ON	VDC		STP					P	

[illegible]

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE 1/8 RPS	1	C	0											
	A	781	O	BASE LOX TK P REG RD	1	C	1	M30	30	G	5%	12C	27 01277 15		1220	4	P	27-11945
	A	781	O	CONNECTED TO 1 C 1	1	C	2											
	A	781	O	CONNECTED TO 1 C 2	1	C	3											
	A	781	O	CONNECTED TO 1 C 3	1	C	4											
	A	781	O	CONNECTED TO 1 C 4	1	C	5											
	A	781	O	CONNECTED TO 1 C 5	1	C	6											
	A	781	O	CONNECTED TO 1 C 6	1	C	7											
	A	782	O	BASE LOX TK P REG LG	1	C	9	M30	30	G	5%	12C	27 01277 15		1220	4	P	27-11945
	A	782	O	CONNECTED TO 1 C 9	1	C	10											
	A	782	O	CONNECTED TO 1 C 10	1	C	11											
	A	782	O	CONNECTED TO 1 C 11	1	C	12											
	A	782	O	CONNECTED TO 1 C 12	1	C	13											
	A	782	O	CONNECTED TO 1 C 13	1	C	14											
	A	782	O	CONNECTED TO 1 C 14	1	C	15											
	A	783	O	BASE LOX TK P REG TG	1	C	17	M30	30	G	5%	12C	27 01277 15		1220	4	P	27-11945
	A	783	O	CONNECTED TO 1 C 17	1	C	18											
	A	783	O	CONNECTED TO 1 C 18	1	C	19											
	A	783	O	CONNECTED TO 1 C 19	1	C	20											
	A	783	O	CONNECTED TO 1 C 20	1	C	21											
	A	783	O	CONNECTED TO 1 C 21	1	C	22											
	A	783	O	CONNECTED TO 1 C 22	1	C	23											
	A	925	O	LOX TK P REG RADIAL	1	C	25	M30	30	G	5%	12C	27 01277 15		1220	4	P	27-11945
	A	925	O	CONNECTED TO 1 C 25	1	C	26											
	A	925	O	CONNECTED TO 1 C 26	1	C	27											
	A	925	O	CONNECTED TO 1 C 27	1	C	28											
	A	925	O	CONNECTED TO 1 C 28	1	C	29											
	A	925	O	CONNECTED TO 1 C 29	1	C	30											
	A	925	O	CONNECTED TO 1 C 30	1	C	31											
	A	926	O	LOX TK P REG TANG	1	C	33	M30	30	G	5%	12C	27 01277 15		1220	4	P	27-11945
	A	926	O	CONNECTED TO 1 C 33	1	C	34											
	A	926	O	CONNECTED TO 1 C 34	1	C	35											
	A	926	O	CONNECTED TO 1 C 35	1	C	36											

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
	A	926	0	CONNECTED TO 1 C 36	1	C	37											
	A	926	0	CONNECTED TO 1 C 37	1	C	38											
	A	926	0	CONNECTED TO 1 C 38	1	C	39											
					1	C	41											
					1	C	43											
					1	C	45											
					1	C	47											
				0% CALIB	1	C	49											
				50% CALIB	1	C	51											
				100% CALIB	1	C	55											
				SYNC & 100% CALIB	1	C	55											
				CONNECTED TO 1 C 55	1	C	56											
				CONNECTED TO 1 C 56	1	C	57											
				CONNECTED TO 1 C 57	1	C	[illegible]											
				CONNECTED TO 1 C 58	1	C	59											
	M	78	X	STROBE LIGHT OCCUR	1	C	95	OFF	ON	VDC		STP					P	

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1	2 SYSTEM	3 MEASUREMENT NO.	4 TYPE MEASUREMENT	5 DESCRIPTION	6 TELEMETER NO.	7 SUB-CARRIER NO.	8 COMMUTATOR PIN NO.	9 MEASUREMENT RANGE LOW	9 MEASUREMENT RANGE HIGH	10 UNITS OF FUNCTION	11 ACCURACY	12 RATE OF CHANGE OR FREQUENCY OF FUNCTION	13 TYPE OF TRANSDUCER	14 SERIAL NO.	15 STATION NO.	16 QUADRANT	17 CARD CODE	DRAWING NUMBERS
				DIGITAL CHANNEL	1	E	0											
	I	502	L	COMPUTER VELOCITY X	1	E	A	0	22K	F/S		10K					P	
	I	503	L	COMPUTER VELOCITY Y	1	E	B	0	4K	F/S		10K					P	
	I	504	L	COMPUTER VELOCITY Z	1	E	C	0	6K	F/S		10K					P	
	I	510	M	ELAPSED TIME	1	E	D	0	450	SEC		10K					P	
	I	505	M	COMPUTER POSITION X	1	E	E	0	6K	NM		10K					P	
	I	506	M	COMPUTER POSITION Y	1	E	F	M300	300	NM		10K					P	
	I	507	M	COMPUTER POSITION Z	1	E	G	0	700	NM		10K					P	
	I	509	M	AZM ERROR FUNCTION	1	E	H	M300	500	NM		10K					P	
	I	508	M	RANGE ERROR FUNCTION	1	E	I	0	6K	NM		10K					P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE CONT.	2	0	0											
					2	1												
	P	84	B	B1 PUMP SPEED	2	2		5680	6400	RPM	60	SLO	27 01267 1	6	1198	4	P	27-11721
	I	529	V	ROLL RESOLVER SIG	2	3		M10	10	VAC		6					P	
	I	530	V	PITCH RESOLVER SIG	2	4		M30	30	VAC		10					P	
	I	528	V	YAW STEERING SIG	2	5		M3	3	VAC		10					P	
	I	549	D	PITCH SERVO ERROR	2	6		M4.1	4.1	MIN		20					P	
	I	521	X	VERN ENGINE COF SIG	2	6	S	OFF	ON			BLP					P	
	I	552	D	REDNDT GYRO PICK-OFF	2	7		M2.7	2.7	MIN		35					P	
	I	537	X	COMPUTER REDUNDANCY	2	7	S	OFF	ON			BLP					P	
	I	580	V	AZM RESOLVER SIG	2	8		M7.8	7.8	VAC		40					P	
	I	581	W	TIME T	2	8	S					BLP					P	
	I	550	D	ROLL SERVO ERROR	2	9		M4.1	4.1	MIN		100					P	
	I	522	X	S ENGINE COF SIG	2	9	S	OFF	ON			BLP					P	
	I	551	D	AZIMUTH SERVO ERROR	2	10		M5.1	5.1	MIN		100					P	
	I	523	X	S&V COF RELAYS	2	10	S	OFF	ON			BLP					P	

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	System	Measurement Number	Type Measurement	Description	Telemeter No.	Sub-Carrier No.	Commutator Pin No.	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No.	Station No.	Quadrant	Card Code	Drawing Numbers
				CONM. RATE 2.5 MPS	2	11	0											
	S	296	D	SUSTAINER YAW	2	11	1	M3.0	3.0	DEG	.3	30	7 01680 9	7898	1210	1	M	27-11720
	S	297	D	SUSTAINER PITCH	2	11	3	M3.0	3.0	DEG	.3	30	7 01680 3	12598	1210	2	M	27-11720
	S	205	D	B1 YAW	2	11	5	M5	5	DEG	.5	30	7 01680 7	8988	1212	4	M	27-11721
	S	203	D	B1 PITCH ROLL	2	11	7	M5	5	DEG	.5	30	7 01680 7	9228	1212	1	M	27-11721
	S	54	R	YAW RATE GYRO SIG	2	11	9	M6	6	D/S	.3	15		68			M	
	S	53	R	PITCH RATE GYRO SIG	2	11	11	M6	6	D/S	.3	15		68			M	
	S	52	R	ROLL RATE GYRO	2	11	13	M8	8	D/S	.3	15		68			M	
	I	529	V	ROLL RESOLVER SIG	2	11	15	M10	10	VAC		6					M	
	I	530	V	PITCH RESOLVER SIG	2	11	17	M30	30	VAC		10					M	
	I	528	V	YAW STEERING SIG	2	11	19	M3	3	VAC		10					M	
	I	549	D	PITCH SERVO ERROR	2	11	21	M4.1	4.1	MIN		20					M	
	I	552	D	REDNDT GYRO PICK-OFF	2	11	23	M2.7	2.7	MIN		35					M	
				100% CALIB	2	11	25											
				0% CALIB	2	11	27											
				50% CALIB	2	11	29											
	I	580	V	AZM RESOLVER SIG	2	11	31	M7.8	7.8	VAC		40					M	
	I	550	D	ROLL SERVO ERROR	2	11	33	M4.1	4.1	MIN		100					M	
	I	551	D	AZIMUTH SERVO ERROR	2	11	35	M5.1	5.1	MIN		100					M	
A	F	212	P	FUEL PRESS ORFC IN	2	11	37	40	70	PIG	2.1	SLO	27 01243 7				P	
					2	11	39											
					2	11	41											
	P	279	P	B2 LO2 PR LUB OIL MN	2	11	43	0	125	PIA	5	SLO	27 01243 9	16152	1144	3	P	27-11722
	P	473	P	B1 LO PR LUB OIL MAN	2	11	45	0	100	PIA	5	SLO	27 01243 9	15704	1173	1	P	27-11721
	P	341	P	S LUBE OIL MANIFOLD	2	11	47	0	1000	PIA	38	SLO	7 01731 7	57298	1235	1	P	27-11720
					2	11	49											
	H	212	P	VERNIER RETURN	2	11	51	0	200	PIA	55	SLO	27 01243 11		1208	4	P	27-11651
	H	224	P	B HYD SYS LO PRESS	2	11	53	0	200	PIA	55	SLO	27 01243 11		1180	4	P	27-11897
				SYNC & 100% CALIB	2	11	55											
				CONNECTED TO 2 11 55	2	11	56											
				CONNECTED TO 2 11 56	2	11	57											
				CONNECTED TO 2 11 57	2	11	58											
				CONNECTED TO 2 11 58	2	11	59											

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Vehicle (1)	System (2)	Measurement Number (3)	Type Measurement (4)	Description (5)	Telemeter No (6)	Sub-Carrier No (7)	Commutator Pin No (8)	Measurement Range Low (9)	Measurement Range High (9)	Units of Function (10)	Accuracy (11)	Rate of Change or Frequency of Function (12)	Type of Transducer (13)	Serial No (14)	Station No (15)	Quadrant (16)	Cabs (17)	Drawing Numbers
				COMM. RATE CONT.	2	A	O											
	I	516	A	ACCELEROMETER YF1	2	A		M12	12	G							P	
	I	519	A	ACCELEROMETER YF2	2	C		M12	12	G							P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Telemeter No	Sub-Carrier No	Commutator Pin No	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	I/C of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
				CONM. RATE 30 RPS	2	E	0											
	P	6	P	S THRUST CHAMBER	2	E	1	0	1000	PIA	16	150	7 01731 9	64378	1295	1	P	27-11720
	P	330	P	S FUEL PUMP DISCH	2	E	3	0	1500	PIA	38	15	7 01731 7	61518	1295	1	P	27-11720
	S	223	D	V2 PITCH	2	E	5	0	50	DEG	3	10	7 01414 1	10852	1123	2	P	27-11699
	S	222	D	V1 PITCH	2	E	7	0	50	DEG	3	10	7 01414 1	10521	1123	4	P	27-11699
	P	60	P	B1 THRUST CHAMBER	2	E	9	0	890	PIA	18	15	7 01731 3	53728	1244	1	P	27-11684
	P	59	P	B2 THRUST CHAMBER	2	E	11	0	800	PIA	18	15	7 01731 3	74958	1244	2	P	27-11684
	S	233	D	V1 YAW ROLL	2	E	13	M70	70	DEG	7	10	27 01205 1	349H	1129	4	P	27-11699
	S	204	D	B2 PITCH ROLL	2	E	15	M5	5	DEG	.5	10	7 01680 7	9628	1212	2	P	27-11722
	S	234	D	V2 YAW ROLL	2	E	17	M70	70	DEG	7	10	27 01205 1	223H	1129	2	P	27-11699
	S	206	D	B2 YAW	2	E	19	M5	5	DEG	.5	10	7 01680 7	1211E	1212	2	P	27-11722
	P	39	P	B1 FUEL PUMP DISCH	2	E	21	0	1000	PIA	40	15	7 01731 5	4556	1173	1	P	27-11721
	P	38	P	B2 FUEL PUMP DISCH	2	E	23	0	1000	PIA	40	15	7 01731 5	74428	1144	3	P	27-11722
				100% CALIB	2	E	25											
				0% CALIB	2	E	27											
				50% CALIB	2	E	29											
	P	6	P	CONNECTED TO 2 E 1	2	E	31											
	P	330	P	CONNECTED TO 2 E 3	2	E	33											
	S	223	D	CONNECTED TO 2 E 5	2	E	35											
	S	222	D	CONNECTED TO 2 E 7	2	E	37											
	P	60	P	CONNECTED TO 2 E 9	2	E	39											
	P	59	P	CONNECTED TO 2 E 11	2	E	41											
	S	233	D	CONNECTED TO 2 E 13	2	E	43											
	S	204	D	CONNECTED TO 2 E 15	2	E	45											
	S	234	D	CONNECTED TO 2 E 17	2	E	47											
	S	206	D	CONNECTED TO 2 E 19	2	E	49											
	P	39	P	CONNECTED TO 2 E 21	2	E	51											
	P	38	P	CONNECTED TO 2 E 23	2	E	53											
				SYNC & 100% CALIB	2	E	55											
				CONNECTED TO 2 E 55	2	E	56											
				CONNECTED TO 2 E 56	2	E	57											
				CONNECTED TO 2 E 57	2	E	58											
				CONNECTED TO 2 E 58	2	E	59											
	V	102	L	EJECTION VELOCITY	2	E	75	ON	OFF								P	
	V	141	X	EJECT SURE SIG	2	E	85	ON	OFF								P	
	D	3	X	RSC DESTRUCT OUTPUT	2	E	95	0	30	VDC		STP					P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBER
				COMM. RATE CONT.	3	0	0											
					3	1												
					3	2												
					3	3												
					3	4												
	M	79	A	MSL AXIAL ACCEL FINE	3	5		M.5	0.5	G	.05	20	67 93900 063	2949F	1057	4	P	27-11782
					3	6												
	M	143	D	BOOSTER SEPARATION	3	7		0	8	IP	.25	14	7 01676 1	LU131	1131	1	P	27-11723
					3	8												
	I	563	V	COMPUTER M50 PSUP	3	9		M55	0	VDC		SLO					P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUBCARRIER NO.	COMMUTATOR PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE TRANSDUCER	SERIAL NO.	STATION NO.	QUADRANT	CABLE CODE	DRAWING NUMBERS
				COMM. RATE 2.5 RPS	3	10	0											
	A	464	T	THST STRUCTURE OTBD	3	10	1	0	1000	DGF	4%	SLO	CR/CN		1170	4	P	27-11843
	A	443	T	19 GM CALOR QUAD I	3	10	3	0	1000	DGF	4%	SLO	27 19912 1		1269	1	P	27-11843
	A	409	T	BLACK CALOR QUAD II	3	10	5	0	1000	DGF	4%	SLO	27 11912 5		1269	1	P	27-11843
	A	412	T	BLACK CALOR QUAD IV	3	10	7	0	1000	DGF	4%	SLO	27 19912 3		1269	4	P	27-11843
	A	438	T	38 GM CALOR QUAD IV	3	10	9	0	1000	DGF	4%	SLO	27 19912 3		1269	4	P	27-11843
	A	439	T	38 GM CALOR QUAD I	3	10	11	0	1000	DGF	4%	SLO	27 19912 2		1269	1	P	27-11843
	A	440	T	19 GM CALOR QUAD IV	3	10	13	0	1000	DGF	4%	SLO	27 19912 1		1269	4	P	27-11843
	A	473	T	HEAT SHIELD OUTER	3	10	15	0	1000	DGF	4%	SLO	CR/CN		1269	3	P	27-11843
	A	470	T	B2 HAT SECTION OTBRD	3	10	17	0	1000	DGF	4%	SLO	CR/CN		1281	2	P	27-11843
	A	692	T	B1 NACELLE INSUL FWD	3	10	19	500	1500	DGR	40	SLO	CR/CN		1143	4	P	27-11843
	A	693	T	B2 NACELLE INSUL FWD	3	10	21	500	1500	DGR	40	SLO	CR/CN		1143	4	P	27-11843
	A	694	T	B1 NACELLE INSUL CTR	3	10	23	500	1500	DGR	40	SLO	CR/CN		1196	4	P	27-11843
				100% CALIB	3	10	25											
				0% CALIB	3	10	27											
				0% CALIB	3	10	29											
	A	695	T	B3 NACELLE INSUL CTR	3	10	31	500	1500	DGR	40	SLO	CR/CN		1196	2	P	27-11843
	A	696	T	B1 NACELLE INSUL AFT	3	10	33	500	1500	DGR	40	SLO	CR/CN		1213	4	P	27-11843
	A	697	T	B2 NACELLE INSUL AFT	3	10	35	500	1500	DGR	40	SLO	CR/CN		1213	2	P	27-11843
	A	467	T	B2 HAT SECTION INBRD	3	10	37	0	1000	DGF	4%	SLO	CR/CN		1281	2	P	27-[illegible]
	A	476	T	HEAT SHIELD INNER	3	10	39	0	500	DGF	4%	SLO	CR/CN		1269	3	P	27-11843
	A	933	T	AEDC AFT SHLD CALOR	3	10	41	0	1300	DGF	4	SLO	FE/CN		1268	3	P	27-11923
	A	934	T	AEDC AFT SHLD CALOR	3	10	43	0	1300	DGF	4	SLO	FE/CN		1268	4	P	27-11923
	A	935	T	AEDC AFT SHLD CALOR	3	10	45	0	1300	DGF	4	SLO	FE/CN		1268	4	P	27-11923
A	F	376	T	LOX TK ULG STA 846	3	10	47	150	1050	DGR	4%	SLO	CR/CN		846	2	P	27-11824
A	F	377	T	LOX TK ULG STA 867	3	10	49	150	1050	DGR	4%	SLO	CR/CN		867	2	P	27-11824
B	F	781	T	LO2 TK ULG STA 740	3	10	51	150	1050	DGR	4%	SLO	CR/CN		740	2	P	27-11824
B	F	782	T	LO2 TK ULG STA 762	3	10	53	150	1050	DGR	4%	SLO	CR/CN		762	2	P	27-11824
				SYNC & 100% CALIB	3	10	55											
				CONNECTED TO 3 10 55	3	10	56											
				CONNECTED TO 3 10 56	3	10	57											
				CONNECTED TO 3 10 57	3	10	58											
				CONNECTED TO 3 10 58	3	10	59											

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	VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUB-CARRIER NO	COMMUTATOR PIN NO	RANGE LOW	RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
					COMM. RATE 2.5 RPS	3	11	0											
A		F	374	T	LOX TK ULG STA 807	3	11	1	150	1050	DGR	48	SLO	CR/CN		807	2	P	27-11824
A		F	375	T	LOX TK ULG STA 827	3	11	3	150	1050	DGR	48	SLO	CR/CN		827	2	P	27-11824
		P	713	T	B1 GAS GEN COMBUSTOR	3	11	5	0	1500	DGF		SLO	27 01247 3	124L	1210	1	P	27-11721
		P	714	T	B2 GAS GEN COMBUSTOR	3	11	7	0	1500	DGF		SLO	27 01247 3	77L	1210	3	P	27-11722
		P	709	T	SGG COMBUSTOR	3	11	9	0	1500	DGF		SLO	27 01247 3	51L	1234	4	P	27-11720
		A	682	T	#1 AIG POD INSUL OUT	3	11	11	500	1500	DGR	40	SLO	CR/CN		1012	2	P	27-11846
		A	683	T	#1 AIG POD INSUL IN	3	11	13	500	1500	DGR	40	SLO	CR/CN		1012	2	P	27-11846
		A	684	T	#2 AIG POD INSUL OUT	3	11	15	500	1500	DGR	40	SLO	CR/CN		1051	2	P	27-11846
		A	685	T	#2 AIG POD INSUL IN	3	11	17	500	1500	DGR	40	SLO	CR/CN		1051	2	P	27-11846
		A	686	T	#3 AIG POD INSUL OUT	3	11	19	500	1500	DGR	40	SLO	CR/CN		1048	2	P	27-11846
		A	687	T	#3 AIG POD INSUL IN	3	11	21	500	1500	DGR	40	SLO	CR/CN		1048	2	P	27-11846
		A	688	T	#4 AIG POD INSUL OUT	3	11	23	500	1500	DGR	40	SLO	CR/CN		1084	3	P	27-11846
					100% CALIB	3	11	25											
					0% CALIB	3	11	27											
		U	409	V	PU VLV COMMAND VOLT	3	11	29	M.6	.6	VDC		SLO					P	
B		F	773	T	LOX TK ULG STA [illegible]0	3	11	31	150	800	DGR	48	SLO	CR/CN		540	2	P	27-11684
B		F	774	T	LOX TK ULG STA 570	3	11	33	150	800	DGR	48	SLO	CR/CN		570	2	P	27-11684
B		F	775	T	LOX TK ULG STA 600	3	11	35	150	800	DGR	48	SLO	CR/CN		600	2	P	27-11684
B		F	777	T	LOX TK ULG STA 660	3	11	37	150	800	DGR	48	SLO	CR/CN		660	2	P	27-11824
B		F	780	T	LOX TK ULG STA 720	3	11	39	150	800	DGR	48	SLO	CR/CN		720	2	P	27-11824
		F	[illegible]	T	LOX TK CTR STA 787	3	11	41	150	800	DGR	48	SLO	CR/CN		787	2	P	27-11824
		A	689	T	#4 AIG POD INSUL IN	3	11	43	500	1500	DGR	40	SLO	CR/CN		1084	3	P	27-11846
		A	690	T	#5 AIG POD INSUL OUT	3	11	45	500	1500	DGR	40	SLO	CR/CN		1099	2	P	27-11846
		A	691	T	#5 AIG POD INSUL IN	3	11	47	500	1500	DGR	40	SLO	CR/CN		1099	2	P	27-11846
		A	438	T	AIG POD AMBIENT SKIN	3	11	49	500	1500	DGR	40	SLO	CR/CN		[illegible]88	3	P	27-11846
B		F	776	T	LOX TK ULG STA 630	3	11	51	150	1050	DGR	48	SLO	CR/CN		630	2	P	27-11824
A		F	371	T	LOX TK ULG STA 691	3	11	53	150	1050	DGR	48	SLO	CR/CN		691	2	P	27-11824
					SYC & 100% CALIB	3	11	55											
					CONNECTED TO 3 11 55,3 11 56														
					CONNECTED TO 3 11 56,3 11 57														
					CONNECTED TO 3 11 57,3 11 58														
					CONNECTED TO 3 11 58,3 11 59														

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO	SUBCARRIER NO	COMMUTATOR PIN NO	SIGNAL ELEMENT RANGE LOW	SIGNAL ELEMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	BRACKET	CARD CODE	DRAW NO NUMBERS
				COMM. RATE 5 RPS	3	12	0											
	Y	103	X	BAROSWITCH	3	12	1	ON	OFF								P	
	Y	104	X	TIMER START CYCLE	3	12	1	ON	OFF								P	
	Y	105	X	BOOSTER ACCEL CYCLE	3	12	1	ON	OFF								P	
	Y	106	X	SUSTAINER HALF CYCLE	3	12	1	ON	OFF								P	
	Y	150	X	FAIRING RELEASE	3	12	3	ON	OFF								P	
	Y	151	X	UNL TCH SIGNAL	3	12	3	ON	OFF								P	
	Y	152	X	MOTOR START SIGNAL	3	12	9	ON	OFF								P	
	Y	153	X	EJECT SIGNAL	3	12	5	ON	OFF								P	
	Y	154	X	TUBE ORIENTATION	3	12	5	ON	OFF								P	
	Y	155	X	TUBE UNLATCH	3	12	7	ON	OFF								P	
	Y	156	V	BATTERY VOLTAGE	3	12	9	ON	OFF								P	
	Y	162	L	EJECTION VELOCITY	3	12	11	ON	OFF								P	
	Y	1[illegible]	X	EJECT SURE SIG	3	12	11	ON	OFF								P	
					3	12	13											
					3	12	15											
					3	12	17											
					3	12	19											
					3	12	21											
					3	12	23											
				XDUCER VOLT CALIB	3	12	25											
				0% CALIB	3	12	27											
				0% CALIB	3	12	29											
					3	12	31											
					3	12	33											
					3	12	35											
					3	[illegible]	37											
					3	12	39											
					3	12	4[illegible]											
					3	12	43											
					[illegible]	12	45											
					3	12	47											
					3	12	49											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TM MEASUREMENT	DESCRIPTION	TELEMETER NO	SUBCARRIER NO	COMMUTATOR PIN NO	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	DIAGRAM	CARD CODE	DRAWING NUMBERS
					3	12	51											
					3	12	53											
				SYNC & 100% CALIB	3	12	55											
				CONNECTED TO 3 12 55	3	12	56											
				CONNECTED TO 3 12 56	3	12	57											
				CONNECTED TO 3 12 57	3	12	58											
				CONNECTED TO 3 12 58	3	12	59											

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	TELEMETER NO.	SUB-CARR. # NO.	COMMUT. SEG PIN NO.	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
				COMM. RATE CONT.	3	13	0											
	I	517	A	ACCELEROMETER ZF1	3	13		M12	12	G							D	
	I	520	A	ACCELEROMETER ZF2	3	A		M12	12	G							D	
	I	513	A	ACCEL XF1 DIRECT	3	C		M12	12	G							D	
	I	514	A	ACCEL XF2 DIRECT	3	C		M12	12	G							D	

SECTION 10

LANDLINE INSTRUMENTATION

The Landline Instrumentation presented in this section contains the latest available characteristics of the individual measurements. In addition the type of recordings indicated.

A	F	1125	P	B CTL PNEU REG OUT	S	200	800	PIA	16	SLO	7 01731	3	2841	1243	4	27-16500
A	F	1194	P	FACILITY GN_2 SUPPLY	S	0	2400	PIG	48	SLO						
A	F	1268	P	ST PNEU REG OUT	S	0	800	PIA	10	SLO	7 01720	1		1223	2	27-16505
A	G	1026	V	PITCH ANALOG	D	M30	30	VDC	0.2	SLO						27-0001-3

VEHICLE

MEASUREMENT NUMBER

MEASUREMENT DESCRIPTION

This is a brief, usually abbreviated description of the measurement.

RECORDER ASSIGNMENT

This code defines the method to be utilized to record the measurement. A double letter here indicates that this measurement will be recorded on two different types of recorders.

MEASUREMENT RANGE

Range of interest of the function being measured expressed in "Units of Function."

UNITS OF FUNCTION

ACCURACY REQUIREMENT

Present in units of the function measured.

FREQUENCY RESPONSE

Denotes the frequency response requirements in cps of the instrumentation system for the measurement.

TRANSDUCER SERIAL NUMBER

TRANSDUCER IDENTIFICATION

Convair part number of the transducer utilized for the measurement.

TRANSDUCER LOCATION

Missile station number and quadrant of transducer installation.

INSTALLATION DETAILS

Drawing Numbers of Mechanical Installation Drawings.

NOTE: For a more detailed explanation of this format and a key to abbreviations and coding see the IBM Code Key in the Summary report.

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MISSILE 18E L/L   REPORT NO AZC-27-059-18   DATE 16 MAR 61   PAGE 1

Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	D			RANGE SAFETY SYSTEM														
	D	5142	V	RSC #1 BAT DC		M											P	
	D	5143	V	RSC #2 BAT DC		M											P	
	D	5140	W	RSC #1 TOTAL TIMER.		M		0	1000	HR							P	
	D	5141	W	RSC #2 TOTAL TIMER		M		0	1000	HR							P	
	D	5150	W	RSC #1 & 2 BATTERY		M		0	1000	HR							P	
	E			ELECTRICAL POWER SYS														
	E	5066	C	MISSILE DC AMPS		M		0	200	AMP							P	
	E	5068	C	EMERGENCY GENERATOR		M		0	200	AMP							P	
	E	5005	Q	INVERTER FREQUENCY		M		350	450	CPS							P	
	E	5029	Q	MISSILE EXT PHASE A		M		350	450	CPS							P	
	E	5031	Q	PHASE A EXT @ MSL		M		396	404	CPS							P	
	E	5003	V	BATTERY OUTPUT		M		15	35	VDC							P	
	E	5006	V	INVERTER PHASE A		M		90	140	VAC							P	
	E	5022	V	MISSILE AC EXT @ MSL		M		110	120	VAC							P	
	E	5023	V	MISSILE EXTERNAL AC		M		110	120	VAC							P	
	E	5030	V	MISSILE DC EXT @ MSL		M		0	40	VDC							P	
	E	5065	V	MISSILE EXTERNAL DC		M		0	40	VDC							P	
	E	5109	W	MAIN MSL BATT TIMER		M											P	
	E	5110	W	INVERTER TIMER		M											P	
	F			PNEUMATIC SYSTEM														
	F	1309	D	GND LO2 TK VENT VLV	R			OPN	CLS			SLO					P	
	F	1001	P	LO2 TANK HELIUM	O			0	50	PIG	1	SLO	27 01243 5	15761	484	3	P	27-11679

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MISSILE INSTRUMENTATION LOG SHEET

MISSILE 18E L/L REPORT NO AZC-27-059-18 DATE 16 MAR 61 PAGE 2

VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
	F	5001	P	LO2 TANK HELIUM		M		0	50	PIG	1	SLO	27 01243 5	15761	484	3	P	27-11679
	F	1003	P	FUEL TANK HELIUM		O		0	75	PIG	1.5	SLO	27 01243 7	16478	948	3	P	27-11683
	F	5003	P	FUEL TANK HELIUM		M		0	75	PIG	1#5	SLO	27 01243 7	16478	948	3	P	27-11683
	F	5032	P	LN2 PRESSURE		M		0	400	PIG							P	
	F	5053	P	NORM SUP PRESSURE		M		0	4000	PIG							P	
	F	5054	P	EMERG SUP PRESSURE		M		0	4000	PIG							P	
	F	5116	P	DIFFERENTIAL PRESS		M		0	30	PID	.2	SLO					P	
	F	1145	P	S CTL HE BTL DISCH		S		0	3500	PIG	175	SLO	7 01720 5	60685	1213	2	P	27-11650
	F	5145	P	S CTL HE BTL DISCH		M		0	3500	PIG	105	SLO	7 01720 5	60685	1213	2	P	27-11650
	F	1194	P	FACILITY GN2 SUPPLY		S		0	2500	PIG	48	SLO					P	
	F	1246	P	B TANK HE BOTTLES HI		S		0	3500	PIG	105	SLO	7 01720 5	54605	1187	4	P	27-11682
	F	5246	P	B TANK HE BOTTLES HI		M		0	3500	PIG	65	SLO	7 01720 5	54605	1200	4	P	27-11682
	F	1301	P	GND LO2 ULLAGE TANK		S		20	30	PIG	.1	SLO					P	
	F	1302	P	GND FUEL ULLAGE TANK		S		55	65	PIG	.1	SLO					P	
	F	5247	Y	BSTR TANK TEMP		M		M320	M250	DGF	2	SLO	7 01633 58	1044	1221	4	P	27-11682
	H			HYDRAULIC SYSTEM														
	H	1360	P	HPU SUSTAINER RETURN		G		0	200	PIA	2%	SLO					P	
	H	1187	X	BSTR OIL EVACUATION		R		ON	OFF	VDC		STP	PEN 74				P	
	H	1188	X	SUS OIL EVACUATION		R		ON	OFF	VDC		STP	PEN 75				P	
	I			INERTIAL GUIDANCE														
	I	1515	A	ACCELEROMETER X F1				M12	12	G							P	
	I	1516	A	ACCELEROMETER Y F1				M12	12	G							P	
	I	1517	A	ACCELEROMETER Z F1				M12	12	G							P	
	I	1518	A	ACCELEROMETER X F2				M12	12	G							P	
	I	1519	A	ACCELEROMETER Y F2				M12	12	G							P	
	I	1520	A	ACCELEROMETER Z F2				M12	12	G							P	
	I	1591	C	PITCH GYRO TORQUE				M75	75	MA							P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO.	QUADRANT	CARD CODE	DRAWING NUMBERS
	I	1592	C	ROLL GYRO TORQUE				M75	75	MA							P	
	I	1593	C	YAW GYRO TORQUE				M75	75	MA							P	
	I	1594	D	PENDULUM #1 NULL		D	4	M20	20	MIN							P	
	I	1595	D	PENDULUM #2 NULL		D	5	M20	20	MIN							P	
	I	1596	D	OPTIC SIGNAL		D	6	M7.5	7.5	MIN							P	
	I	1505	H	COMPUTER POSITION X				0	6K	NM		10K					P	
	I	1506	H	COMPUTER POSITION Y				M300	500	NM		10K					P	
	I	1507	H	COMPUTER POSITION Z				0	700	NM		10K					P	
	I	1508	H	RANGE ERROR FUNCTION				0	6K	NM		10K					P	
	I	1509	H	AZM ERROR FUNCTION				M300	300	NM		10K					P	
	I	1502	L	COMPUTER VELOCITY X				0	22K	F/S		10K					P	
	I	1503	L	COMPUTER VELOCITY Y				0	4K	F/S		10K					P	
	I	1504	L	COMPUTER VELOCITY Z				0	6K	F/S		10K					P	
	I	1601	V	400 CPS REFERENCE													P	
	I	1606	V	COMPUTER RESET		O		0	10	VDC	15%						P	
	I	1510	W	ELAPSED TIME				0	450	SEC							P	
	I	1521	X	VERN ENGINE COF SIG				OFF	ON			STP					P	
	I	1522	X	S ENGINE COF SIG				OFF	ON			STP					P	
	I	1570	X	STAGING SIG				OFF	ON			STP					P	
	I	1603	X	WORD GATE FIVE				OFF	ON			STP					P	
	I	1604	X	MULT GATE SIX				OFF	ON			STP					P	
	I	1605	X	112 CPS GATE				OFF	ON			STP					P	
	M			MISCELLANEOUS														
	M	5144	V	STROBELIGHT BATTERY		M											P	
	M	1090	X	MSL ONE INCH MOTION		P		OFF	ON				PEN 22				P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	N			FACILITIES & GSE														
	N	5362	D	36 INCH WATER VALVE	M												P	
		1310	P	SLUG CH LO2 DISCH	S			0	500	PIG		SLO					P	
	N	1335	X	SLG CH LO2 DISCH VLV	R			ON	OFF			STP	PEN23 654				P	
	N	1336	X	SLG CH LO2 VENT VLV	R			ON	OFF			STP	PEN24 658				P	
	N	1337	X	SLG CH LO2 INLET VLV	R			ON	OFF			STP	PEN25 657				P	
	N	1338	X	SLG CH LN2 INLET VLV	R			ON	OFF			STP	PEN 26				P	
	N	1339	X	SLG CH GN2 INLET VLV	R			ON	OFF			STP	PEN 27				P	
A	N	1356	X	SLG CH LO2 LOW LEVEL	R			ON	OFF			STP	PEN 59				P	
A	N	1932	X	LO2 TPNG VLV CLOSED	R			ON	OFF			STP	PEN 55				P	
A	N	1933	X	LO2 TPNG VLV OPEN	R			ON	OFF			STP	PEN 56				P	
A	N	1979	X	PRESS VLV CLOSED	R			ON	OFF			STP	PEN 60				P	
	P			PROPULSION SYSTEM														
	P	5242	B	PUMP LC SPEED	M			0	100	PCT							P	
	P	5685	M	FUEL IN MISSILE	M			0	10K	GAL							P	
	P	1206	O	S ENG LO2 DOME	F			M80	80	G	4	2KC	27 01193 1		1215	2	P	27-11921
	P	1208	O	B1 ENG LO2 DOME	F			M80	80	G	4	2KC	27 01193 1		1222	1	P	27-11921
	P	1209	O	B2 ENG LO2 DOME	F			M80	80	G	4	2KC	27 01193 1		1222	3	P	27-11921
	P	1001	P	B1 LO2 PUMP INLET	F			0	300	PIG	15	1KC	7 01728 813		1186	4	P	27-11721
	P	1002	P	B1 FUEL PUMP INLET	F			0	300	PIG	15	1KC	7 01728 813		1186	1	P	27-11721
	P	1003	P	B2 LO2 PUMP INLET	F			0	300	PIG	15	1KC	7 01728 813		1187	2	P	27-11722
	P	1004	P	B2 FUEL PUMP INLET	F			0	300	PIG	15	1KC	7 01728 813		1187	3	P	27-11722
	P	1091	P	B1 LO2 INJ MANIFOLD	F			0	1500	PIG	75	1KC	7 01728 8[illegible]		1222	1	P	27-11921
	P	1092	P	B2 LO2 INJ MANIFOLD	F			0	1500	PIG	75	1KC	7 01728 811		1222	3	P	27-11921
	P	1093	P	B1 FUEL INJ MANIFOLD	F			0	1500	PIG	75	1KC	7 0166[illegible] 17		1222	4	P	27-11921

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	P	1094	P	B2 FUEL INJ MANIFOLD		F		0	1500	PIG	75	1KC	7 01687 17		1222	2	P	27-11921
	P	5373	P	LO2 STORAGE TANK		M		0	50	PIG	.6	SLO					P	
	P	5430	P	FUEL STORAGE TANK		M		0	10	PIG		SLO					P	
	P	1474	P	V CTL PRESS REG OUT		S		200	800	PIG	16	SLO	7 01731 3	46338	1208	1	P	27-11651
A	P	1020	T	B1 LOX PUMP INLET		S		M325	M275	DGF	1	SLO	7 01649 9	1149R	1182	4	P	27-11721
A	P	1054	T	B2 LOX PUMP INLET		S		M325	M275	DGF	1	SLO	7 01649 9	1150R	1189	2	P	27-11722
	P	1325	T	ENG COMP AMBIENT		S		M100	500	DGF	3	SLO	FE/CN		1208	1	P	27-11651
	P	1710	T	SE ENVIRONMENT		S		M100	500	DGF		SLO	CR/CN		1235	3	P	27-17540
	P	1711	T	B1 NACELLE AMBIENT		S		M100	500	DGF		SLO	CR/CN		1204	4	P	27-17546
	P	1712	T	B2 NACELLE AMBIENT		S		M100	500	DGF		SLO	CR/CN		1204	2	P	27-17546
	P	5849	W	LO2 SLUG XFER & FIRE		M											P	
	P	1155	X	OBSERVER CUTOFF		R		OFF	ON	VDC		STP	PEN 16				P	
	P	1161	X	TCC START SWITCH		R		OFF	ON	VDC		STP	PEN 4				P	
	P	1164	X	TCC ENGINE COF SW		R		OFF	ON	VDC		STP	PEN 15				P	
	P	1225	X	ENGINE CONTROL READY		R		OFF	ON	VDC		STP	PEN 32				P	
	P	1229	X	LOX HIGH TOPPING		R		OFF	ON	VDC		STP	PEN 46				P	
	P	1230	X	LOX LOW TOPPING		R		OFF	ON	VDC		STP	PEN 47				P	
	P	1231	X	LOX 100% SLUG COM		R		OFF	ON	VDC		STP	PEN 45				P	
	P	1347	X	S CUTOFF RELAY		R		OFF	ON	VDC		STP	PEN 13				P	
	P	1544	X	VERNIER CONTROL		R		OFF	ON	VDC		STP	PEN 7				P	
	P	1545	X	S IGN STAGE CONTROL		R		OFF	ON	VDC		STP	PEN 6				P	
	P	1546	X	B2 CUTOFF RELAY		R		OFF	ON	VDC		STP	PEN 12				P	
	P	1547	X	B1 CUTOFF RELAY		R		OFF	ON	VDC		STP	PEN 11				P	
	P	1548	X	COMPLETE COF RELAY		R		OFF	ON	VDC		STP	PEN 17				P	
	P	1549	X	IGNITION START		R		OFF	ON	VDC		STP	PEN 5				P	
	S			AUTOPILOT SYSTEM														
	S	5356	D	ROLL PROGRAM READOUT		A											P	
	S	1048	V	PROGRAMMER PITCH SIG		D		0	2.7	VAC	.2	SLO					P	

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Vehicle	System	Measurement Number	Type Measurement	Description	Recorder	Track	Channel	Measurement Range Low	Measurement Range High	Units of Function	Accuracy	Rate of Change or Frequency of Function	Type of Transducer	Serial No	Station No	Quadrant	Card Code	Drawing Numbers
	S	1107	V	B1 PCH ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1108	V	B2 PCH ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1113	V	V1 YAW ACTR FEEDBACK		D		M5	7	VAC	5%	30					P	
	S	1114	V	V2 YAW ACTR FEEDBACK		D		M5	7	VAC	5%	30					P	
	S	1118	V	V2 PCH ACTR FEEDBACK		D		M11	11	VAC	5%	30					P	
	S	1119	V	V1 PCH ACTR FEEDBACK		D		M11	11	VAC	5%	30					P	
	S	1121	V	GYRO TEST SIG		D		M5	5	VAC	.1	STP					P	
	S	1122	V	SERVO TEST SIGNAL		D		M11	11	VAC	5%	30					P	
	S	1128	V	B1 YAW ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1129	V	B2 YAW ACTR FEEDBACK		D		M12	12	VAC	5%	30					P	
	S	1147	V	PITCH GYRO AMP OUT		D		M10	10	VAC	1	30					P	
	S	1148	V	YAW GYRO AMP OUT		D		M10	10	VAC	1	30					P	
	S	1149	V	ROLL GYRO AMP OUT		D		M10	10	VAC	1	30					P	
	S	1216	V	S PCH ACTR FEEDBACK		D		M10	10	VAC	5%	30					P	
	S	1217	V	S YAW ACTR FEEDBACK		D		M10	10	VAC	5%	30					P	
	S	5270	V	FINE HEATER-PITCH		M		0	150	VAC							P	
	S	5271	V	FINE HEATER-YAW		M		0	150	VAC							P	
	S	5272	V	FINE HEATER-ROLL		M		0	150	VAC							P	
	S	5176	W	PROGRAM RUN TIME		M		0	999	SEC							P	
	S	5282	W	DECADE EVENT TIMER		M		0	10K	SEC							P	
	S	1235	X	PROGRAMMER RUN TIME		R		OFF	ON	VDC		STP	PEN 42				P	
	S	1370	X	STAGING		R		OFF	ON	VDC			PEN 43				P	
	S	1371	X	BOOSTER JETTISON		R		OFF	ON	VDC			PEN 44				P	
	S	1372	X	PRESSURIZE VERN TANK		R		OFF	ON	VDC			PEN 3 &28				P	
	S	1373	X	BOOSTER CUTOFF		R		OFF	ON	VDC			PEN 29				P	
	S	1374	X	SUSTAINER CUTOFF		R		OFF	ON	VDC			PEN 30				P	
	S	1375	X	VSHPS BACK-UP SIGNAL		R		OFF	ON	VDC			PEN 48				P	
	S	1376	X	VERNIER CUTOFF		R		OFF	ON	VDC			PEN 31				P	
	S	1377	X	EJECT RV UMBILICAL		R		OFF	ON	VDC			PEN 50				P	
	S	1378	X	RV JETTISON		R		OFF	ON	VDC			PEN 51				P	
	S	1379	X	FIRE RETRO ROCKETS		R		OFF	ON	VDC			PEN 52				P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	
	T			TELEMETERING SYSTEM														
	T	5140	V	TLM #1 BAT DC		M											P	
	T	5141	V	TLM #1 EXTERNAL DC		M											P	
	T	5144	V	TLM #2 BAT DC		M											P	
	T	5145	V	TLM #2 EXTERNAL DC		M											P	
	T	5146	V	TLM #3 BAT DC		M											P	
	T	5147	V	TLM #3 EXTERNAL DC		M											P	
	T	5156	V	TLM 1 FIL INT DC		M											P	
	T	5157	V	TLM 1 FIL EXT DC		M											P	
	T	5158	V	TLM 2 FIL INT DC		M											P	
	T	5159	V	L3M 2 FR3 EX3 D3		4											7	
	T	5160	V	TLM 3 FIL INY DC		M											P	
	T	5161	V	TLM 3 FIL EXT DC		M											P	
	T	5150	W	TLM #1 TOYAL		M		0	1000	HR							P	
	T	5151	W	TLM #2 TOTAL		M		0	1000	HR							P	
	T	5152	W	TLM #3 TOTAL		M		0	1000	HR							P	
	T	5153	W	TLM #1 BAT TIMER		M											P	
	T	5154	W	TLM #2 BAT TIMER		M											P	
	T	5155	W	TLM #1 BATTERY		M		0	60	MIN							P	
	U			PROPELLANT UTILIZ														
	U	1091	V	ERROR RATIO DEMOD OP		S		M20	20	VDC	±5	20					P	
	U	1200	X	LO2 100% SLUG COF-1		R		OFF	ON	VDC		STP	PEN 72				P	
	U	1201	X	LO2 TOPG HI CTL-1		R		OFF	ON	VDC		STP	PEN 70				P	
	U	1202	X	LO2 TOPG LO CTL-1		R		OFF	ON	VDC		STP	PEN 68				P	
	U	1203	X	LO2 99% RAPID LOAD-1		R		OFF	ON	VDC		STP	PEN 66				P	
	U	1204	X	FUEL 100% SEC CTL		R		OFF	ON	VDC		STP	PEN 63				P	
	U	1205	X	FUEL 100% PRI CTL		R		OFF	ON	VDC		STP	PEN 64				P	

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VEHICLE	SYSTEM	MEASUREMENT NUMBER	TYPE MEASUREMENT	DESCRIPTION	RECORDER	TRACK	CHANNEL	MEASUREMENT RANGE LOW	MEASUREMENT RANGE HIGH	UNITS OF FUNCTION	ACCURACY	RATE OF CHANGE OR FREQUENCY OF FUNCTION	TYPE OF TRANSDUCER	SERIAL NO	STATION NO	QUADRANT	CARD CODE	DRAWING NUMBERS
	U	1206	X	FUEL 95% SEC CTL		R		OFF	ON	VDC		STP	PEN 63				P	
	U	1207	X	FUEL 95% PRI CTL		R		OFF	ON	VDC		STP	PEN 62				P	
	U	1208	X	LO2 100% SLUG COF-2		R		OFF	ON	VDC		STP	PEN 73				P	
	U	1209	X	LO2 TOPG HI CTL-2		R		OFF	ON	VDC		STP	PEN 71				P	
	U	1210	X	LO2 TOPG LO CTL-2		R		OFF	ON	VDC		STP	PEN 69				P	
	U	1211	X	LO2 95% RAPID LOAD-		R		OFF	ON	VDC		STP	PEN 67				P	

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